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What's the Point?

A foreword to a pamphlet just issued by the Federation of British Industries dealing with "News of Industry,"* quotes from a speech by Sir Frederick Bain, the following paragraph. "We in industry have been slack, I think, in not getting over the simple, plain facts. If that is the purpose of publicity, then the sooner we get down to thinking about how to put the matter right, the better." For more than a year now, the foundry industry has pioneered the notion that there are advantages to be gained from the institution of a service, in order that the public may receive quickly reliable versions of happenings of general interest. It so happens that unless a member of the management of a concern has some knowledge of journalism coupled with an enthusiasm to keep the name of his company before the public, much good publicity is lost. On the other hand, some foundry concerns, and not only the larger ones, possess a well-developed sense of the value of publicity. Last Thursday, for instance, we published a sad item of news occurring in Australia the previous Monday.

This F.B.I. booklet discloses the basic principles to be observed when dealing with the Press. Stressed is the need for speed, and for this a knowledge of closing times for Press is indispensable. The differentiation of the requirements of the national, both daily and evening, the local and technical and trade Press, must be understood. For the dailies, the compression of the story into a minimum of words, whilst retaining a modicum of publicity and accuracy of statement, is a task of some difficulty. It is one requiring expert help, which the foundry industry gives *gratis*. An aspect of publicity not specifically dealt with, and one to which attention could usefully be given by the publicity managers of some of the largest concerns in the country, is the wholesale distribution of news items, with little or no regard to the field covered by the papers receiving them. For instance, when factory lighting was much in the news, the JOURNAL would receive "before and after" pictures of a textile mill, and conversely, the textile trade Press would receive similar pictures of an ironfoundry.

The second section of this booklet is devoted to "Industry and the Daily Press," and herein much of a really practical character is disclosed. Every manufacturer knows the advantages to be gained from the receipt of an item of plant, when it is properly packed and carries clear instructions for erection and operation. So, too, a busy sub-editor working against the clock, rightly demands the receipt of his "plant" or copy in such a form as will give him a minimum amount of trouble. By meticulously following the precepts enumerated in this section, it will be found that good relations will be established to the permanent value to British industry. As we started by quoting the foreword, we will close by reprinting the final paragraphs: "The more trouble industry takes to find the facts of its achievements—and the more these achievements are fairly and accurately described in the Press—the more will universal pride in those achievements grow. Pride is a great incentive to work; the greater it grows, the quicker this country will be able to stand on its own feet. Publicity for industry is an essential ally of enterprise."

*Available to our readers on writing to Mr. F. L. Stevens, at the F.B.I. office, 21, Tothill Street, London, S.W.1.

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British Standards Institution

Acceptance Tests for Positive-displacement Compressors and Exhausters

Details of British Standard acceptance tests for positive-displacement compressors and exhausters, recently issued, lay down the conditions under which reciprocating and rotary compressors and exhausters shall be tested in order that guarantees made by manufacturers in regard to output, power consumption or speed may be verified. Deviations of the test conditions from the guarantee conditions within which the tests are applicable are noted and guidance on pressure and temperature measurement is given. A recommended form of test report is also included, together with diagrammatic arrangements of the test layouts for the four types of machines covered.

Corrections Minimised

In drawing up the standard tests, every endeavour was made to minimise the corrections which have to be applied to the test results to provide for the deviation between the test and the guarantee conditions. The corrections to power consumption for variations of inlet pressure and pressure ratio are therefore extremely simple, provided that these are within the standard deviation. No correction is applied to power consumption for variations of cooling water temperature within the 15 deg. F. deviation from guarantee conditions permitted. Experiments at cooling-water temperatures differing by 30 deg. F. have shown that the difference between friction horse-power due to the changes in oil temperature which are created through changes in water temperature—for which no correction can be made—have as much influence on the power consumption as the variation in the cooling-water temperature.

This standard is to be followed by a further standard which will deal with acceptance tests for aero-dynamic or turbo-type compressors and exhausters. Copies of the standard (B.S. 1571:1949) may be obtained from the British Standards Institution, Sales Department, 24, Victoria Street, London, S.W.1 (price 2s. 6d., post free).

Mechanical Handling Exhibition

The Mechanical Handling Exhibition, first held in London with considerable success in July, 1948, is to be repeated at Olympia from June 6 to 17, 1950. The next exhibition will be larger than the first, the Grand Hall being used as well as the National Hall, and a run of eleven days instead of nine has been arranged to include two Saturdays so as to encourage visits by factory managers, foremen and operatives. Exhibits will cover the full range of equipment for the handling, lifting, stacking and short-distance transportation of goods, including trucks, conveyor and elevator systems, ropeway, cranes, hoists, winches, gears, chains, pallets and all accessories. Electronic control of lifting gear will be demonstrated.

Shot Blasting Regulations

Public Inquiry to be held

On March 18, 1949, the Minister of Labour and National Service published draft Regulations, entitled the Blasting (Castings and other Articles) Special Regulations, 1949, and gave notice, in accordance with Section 129 of the Factories Act, 1937, and the Second Schedule to that Act, of his intention to make Special Regulations as in that draft.

Certain objections were made to the draft Regulations and the Minister has now, in accordance with the procedure laid down in the above Schedule, directed an inquiry to be held and has appointed Mr. V. R. Aronson, K.C., as Commissioner for this purpose. The inquiry will be held in public and any objector and any other person who in the opinion of the Commissioner is affected by the draft Regulations may appear at the inquiry either in person or by counsel, solicitor or agent.

In accordance with the Factories Act (Conduct of Inquiries) Rules, 1938 (S.R. & O. 1938, No. 586), the Commissioner gives notice that he will open the inquiry at the Ministry of Labour and National Service, 8, St. James's Square, London, S.W.1, at 11 a.m. on September 22, 1949. It is requested that notification be given to the Commissioner not later than September 15, 1949, of any persons or representatives likely to appear at the inquiry. Communications for the Commissioner may be addressed to Mr. J. L. Edwards, Ministry of Labour and National Service, 8, St. James's Square, London, S.W.1, who is acting as secretary for the inquiry.

House Organs

Wiggin Nickel Alloys for August. Published by Henry Wiggin & Company, Limited. This issue contains a number of interesting articles, among which Monel figures prominently. Bee-keeping, ice-cream manufacture, laundry equipment, chaplets, hot drink and food containers, oil and petrol strainers and water distillation, are subjects featured in illustrated articles. Other items dealing with the use of Inconel, cupro-nickel and thermometals also appear.

Ruston News, Summer, 1949. Published by Ruston & Hornsby, Limited, Lincoln. The cover of this issue shows a corner of the Spike Island Foundry pattern shop with a pattern for a Vox engine bedplate in the foreground. The contents provide a well-blended mixture of articles of general interest and gossip about the works personnel.

Steel Horizons, Vol. II, No. 3. Published by the Allegheny Ludlam Steel Corporation, Pittsburg, U.S.A. It is policy of the publishers of the magazine to describe and illustrate the use of stainless steel in various industries. In this issue, not an industry but the zoo has been covered. The coloured illustrations are remarkable for their general interest and beauty. Other features show an ultra-modern clinic, and a stainless office building.

Engineering and Marine Exhibition

Olympia, London, August 25 to September 10

For the first time for a number of years, there is to be no special section devoted to the display of foundry equipment in the Exhibition which opened to-day at Olympia, as this industry decided that a two-year interval was too short a period for the general introduction of new designs. That does not mean, however, that the exhibition is devoid of foundry exhibits, for many of the most prominent amongst manufacturers of castings have taken space. Moreover, there are quite a number of exhibits of foundry plant in the field of compressors, pneumatic tools, melting equipment and pattern shop tools and supplies. We strongly counsel as many of our readers as possible to visit Olympia, and concentrate their attention on those aspects missed in other years through dallying too long on the stands of the foundry-plant manufacturers, *proprement dites.* Below we describe in alphabetical order a number of stands which carry exhibits of direct interest to foundrymen.

Alley & Maclellan, Limited (Grand Hall, ground floor, row J, stand 17).—This firm is showing a range of air compressors and vacuum pumps, including a large two-stage machine producing 600 cu. ft. per min. at 100 lb. per sq. in. directly coupled. Other smaller machines and part assembled units are on view, and many accessories and special valves are featured. Foundrymen use large and increasing amounts of compressed air, and they undoubtedly will find much of direct interest on this stand.

Almin, Limited (Associated Light Metal Industries) (National Hall, ground floor, row R, stand 2).—Two of the members of the Group are represented on this

FIG. 2.—TYPE S.R.4 SAND RAMMER IN USE. (BROOM & WADE, LIMITED.)

FIG. 3.—SLUSH PUMP CASTING, SHOWN BY THE DAVID BROWN FOUNDRIES COMPANY.

Engineering and Marine Exhibition

stand. The first, Southern Forge, Limited, fabricates light metal wrought products, while the second, Renfrew Foundries, Limited, of Glasgow, is claimed to be the largest aluminium foundry in Scotland. Here are displayed a wide range of light-alloy castings, including scavenge pipes, Diesel-engine sumps, timing cases, manifolds, cylinder-head cores and the like. A special feature is made of the castings which go into the making of a Black & Decker electric drill.

Atlas Preservative Company, Limited (Grand Hall, ground floor, row B, stand 7).—Although the exhibits on this stand are devoted mainly to the marine side, there are at least two items of general interest to foundrymen. The first is a high-temperature-resisting aluminium paint suitable for cupolas, furnace doors and frames, as well as general structural steelwork. The second is a degreaser and industrial cleanser known as "Greeskilla" equally suitable for metals, tiles, glass, vitreous enamelled ware and a host of other surfaces, and particularly for machinery *in situ*.

Barlow-Whitney, Limited (Grand Hall, ground floor, row C, stand 8).—Included in this firm's exhibits are examples of electrically-heated ovens, furnaces and white-metal melting pots. The ovens are of the forced-air circulation and ventilation type, but a damper control can be so arranged that only fresh air circulates—this is useful in initial drying. The furnaces are of the tool-room type for temperatures up to 1,100 deg. C. In the melting pot, which is of 500 lb. nominal capacity, delivery of clean metal is arranged through a non-clog valve. Each piece of equipment is complete with all electrical and mechanical accessories.

S. N. Bridges & Company, Limited (Grand Hall gallery, outer row, stand 43).—Particularly of interest on this stand to our readers is an electrically-driven portable foundry sand riddle which can be arranged to take rectangular-shaped screen in contrast to the more usual circular type. The advantage is that tailings are continuously rejected when the screen is in a tilted position. Among other tools on this stand is a precision surface grinder, which, it appears, could be used for correcting slight surface irregularities in the otherwise flat areas of castings.

British Equipment Company, Limited (National Hall gallery, centre row, stand 11).—On this stand, a hand belt sander of interest to pattern-makers is featured, a novel development being an attached dust collector of the vacuum-cleaner type. It is claimed for this attachment, in addition to preventing the dissemination of dust on to adjacent "wet" paint in a shop and its value as a health safeguard, that it prevents "loading" of the sander belt which would reduce efficiency. Other portable tools shown include a wood planer, electrically driven, and a circular hand-saw. The latter is made in a range of models from 6 to 12 in. dia., for timber up to 4¼ in. deep.

J. Brockhouse & Company, Limited (Grand Hall, ground floor, row B, stand 13).—The parent company of this group as well as Brockhouse Castings, Limited, R. J. Hunt, Limited, and Kaye Alloy Castings, Limited, is showing a variety of steel, iron and die castings, both in the "heavy" and "repetition" fields.

Broom & Wade, Limited (Grand Hall, ground floor, row V, stand 10).—This concern, which is showing a wide variety of compressors and pneumatic tools, is also exhibiting a new item of foundry equipment. It is type SR.4 pneumatic sand rammer designed for heavy ramming of medium-size moulds. It has a bore of 1¼ in., a 4-in. stroke, and weighs only 16 lb.; control is by lever-type throttle. Also showing is an air-motor-operated 15-cwt. hoist and numerous examples of light pneumatic accessories—chipping hammers, grinders, a plumbago spray gun, agitators, and the like.

The David Brown Foundries Company (Empire Hall, ground floor, row V, stand 10).—The slush-pump casting shown in Fig. 3 is but one of the intricate castings made by this firm in a variety of special metals and exhibited on the stand either separately or as components of heavy-duty machinery. Another notable casting is the stainless-steel propeller, 4 ft. dia., on a marine gearbox which is shown in motion. A large turbine case casting is also on view.

The B.T.R./Silvertown Group (National Hall gallery, inner row, stand 12).—Although most of the exhibits on this stand are, naturally, concerned with the multiplicity of uses for rubber, a special section is devoted to the Palmer X-ray service for the examination of castings.

George Cohen, Sons & Company, Limited (600 Group) (National Hall, ground floor, row L, stand 1).—A large amount of heavy industrial machinery is shown on this stand, among which the interest of pattern-makers will be focused on woodworking plant made by Metalclad, Limited, including band-saws, lathes, sanders, planing and mortising machines. Foundrymen will be interested by the wide variety of steel castings shown on the part of the stand devoted to the products of K. & L. Steelfounders, Limited. The mobile cranes, also made by this firm, form an impressive setting for the whole of the exhibits.

Commercial X-Rays, Limited (Grand Hall gallery, outer row, stand 53).—Here, the entire exhibits are devoted to X-ray services for castings and weldings. In particular, there is featured a new radium operating container, shown in the open position in Fig. 4. This is manufactured by an associate company—Gamma Rays, Limited—in a range of sizes up to one curie of radon seed. In the closed position the carrying handle is restored and neatly closes the container. Other equipment manufactured by this firm includes that for storage and transportation of the units and all accessories.

Department of Scientific and Industrial Research (Empire Hall, first floor, row U, stand 3).—Among the groups of research institutions whose work in applied science is outlined on this stand is the British Cast Iron Research Association. This section is devoted to a display of photographs, photomicrographs and actual castings with emphasis on the variety of functional uses to which cast materials of different metallic matrices may be put. Space is devoted to the new nodular cast iron and a film show illustrates research carried out on the problem of cavitation erosion of cast-iron marine propellers.

Eyre Smelting Company, Limited (Empire Hall, ground floor, row V, stand 4).—This firm specialises in the supply of non-ferrous ingots to founders and

white metals, bearing metals, cast rod and sticks, etc., to a variety of trades. All the lines are well represented and specimens of work and castings made from these materials are also shown. The activities of this company are not confined to supply alone—a comprehensive service is also given. Naturally, it is difficult to display this feature on the stand, but it is much appreciated by foundrymen generally.

The Gas Council (Grand Hall, ground floor, row A, stand 2).—With the increasing post-war use of gas as an industrial fuel there has arisen a growing demand for consultancy, and this stand has been set up more as an information centre than for actual exhibits. Nevertheless, there is much of interest to the founder, particularly in the muffle furnace, the lip-axis tilting furnace, and the heat-treatment units shown. Other applications of this fuel, for forging, metal cutting, surface heating, etc., will have a more general application to particular sections of the industry.

Holman Brothers, Limited (Empire Hall, first floor, row AA, stand 5).—Among the pneumatic tools exhibited on this stand are a number for use in foundries. Fig. 5 shows a portable surface grinder much used in fettling shops. Sanding machines, chipping hammers, sand rammers of various types, blow guns and air winches are but selections from the wide variety of air-operated equipment. Compressors and compressed-air motors are also featured.

Keith Blackman, Limited (National Hall, ground floor, row P, stand 11).—This company is showing various types of fans and blowers, air-heaters, air filters, compressors and self-contained units for removing fumes from welding and for exhausting dust from grinding. Additionally there is a new dust settling plant. All these, with the present trend towards "better housekeeping," have major appeal to foundries. Cupola air-supply equipment, in which the firm has long specialised, is covered by a representative selection of blowers and fans, while the air filters, incorporating viscous-oil-film cells for retaining dust in air streams, are applicable to a number of industrial problems.

Major, Robinson & Company, Limited (Grand Hall, ground floor, rows A and B, stands 5 and 6).—These well-known makers of iron cements and fillers are showing a complete range of products from their new factory, which is now in full production.

Mond Nickel Company, Limited (Grand Hall, ground floor, row G, stand 2).—This year, the stand of this company is intended to show how nickel alloys can assist designers and engineers by relating composition to specific service requirements. There is an advisory staff available to deal with questions including those arising in connection with nickel-containing casting alloys. Of particular interest to foundrymen is the fact that the new inoculant for cast iron "Nisiloy" will be the subject of a colour film, showing continuously throughout the period of the exhibition. On a second section of this stand are shown the wrought nickel alloys produced by Henry Wiggin & Company, Limited.

Morgan Crucible Company, Limited (Grand Hall, ground floor, row E, stand 12).—On this stand there is much of particular importance to foundrymen. Prominent among the exhibits is the new rotary crucible furnace to melt swarf and powders, for which is claimed the highest metal reclamation figures yet achieved. There is also a thermostatic control unit for holding metal at temperature in gas-fired furnaces; a self-contained paraffin-fired miniature crucible furnace, a hydraulic tilting furnace, and a display of plumbago products. Included in the latter is a plunger-mixer (shown in use in Fig. 6); this tool, now that there is wider use of "modification" and ladle treatment of both ferrous and non-ferrous alloys, has an increased applicability to everyday foundry processes.

Newton Victor, Limited (Empire Hall, ground floor, row X, stand 1).—This company, which represents the combined X-ray interests of Metropolitan-Vickers, Victor X-ray Corporation, and Newton & Wright, Limited, is exhibiting two examples from the wide range of industrial X-ray plants manufactured, as well as a selection of accessories. Model OX.140 is a light X-ray unit operating at voltages up to 140 kV. and designed for iron and steel sections up to 1¼ in. thick and all light-alloy castings. The second example, model OX.250, for voltages up to 250 kV., is for iron and steel of 2¼ to 3 in. thick, this may have either stationary or mobile jib-crane mounting equipment. Photographs on the stand show models up to 2,000 kV. capacity for steel up to 12 in. thick; others show how preventive measures, derived from X-ray examinations, can be applied, for example, to foundry processes.

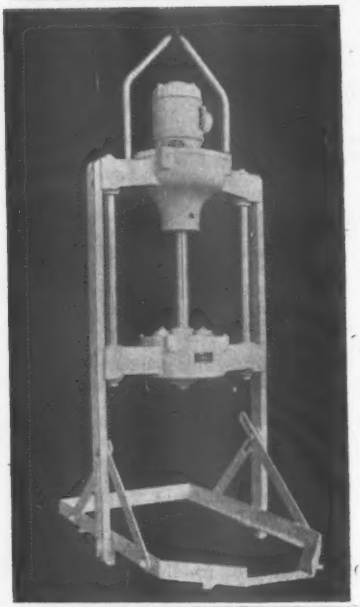
G. Perry & Sons (Grand Hall gallery, inner row, stand 25).—This well-known pattern-making company, in addition to a fine display of wood and metal patterns (see Fig. 7), is showing an interesting new production line pressure casting of metal patterns. It is claimed that this is the first time the system has been exhibited in this country. For operating the method, and to give additional space for the old-established processes, a new foundry and metal-pattern shop have recently been opened by the company at Leicester.

Philips Electrical, Limited (Grand Hall, ground floor, row G, stand 16).—This firm is also showing industrial X-ray equipment. Models include the "Macro" series, 150, 200 and 300 units for steel thicknesses, in steps, up to 4 in. Mobility and safety protection are features which are specially provided for. Insulation needs to be particularly robust for foundry and shipyard use and this factor is well considered. Accessories include dark-room equipment and there is a display of pictures of ancillary scientific equipment manufactured by the company.

Safety Products, Limited (Grand Hall, ground floor, row A, stand 22).—On this stand, a complete range of protective devices, suitable for foundrymen and welders alike, is on view. These include chippers' and grinders' goggles (the spectacle type is reported to be gaining in popularity) as well as the series of "Protex" coloured glasses for safeguarding the sight of furnacemen and others exposed to glare.

Sheepbridge Stokes Centrifugal Castings Company, Limited (Grand Hall, ground floor, row H, stand 12).—This is one of the few stands in the exhibition devoted solely to castings. The company has been long established in the production of special irons for cylinder liners, piston rings, sleeves, valve guides and the like, produced, mainly, by the centrifugal process, and fine examples of these are on view. A variety of alloys

Engineering and Marine Exhibition



← FIG. 1.—FOUNDRY SAND SIEVE. (S. N. BRIDGES & COMPANY, LIMITED.)

→ FIG. 4.—COMBINED CONTAINER AND EXPOSURE UNIT FOR RADON SEED, SHOWN IN THE "OPEN" POSITION. (COMMERCIAL X-RAYS, LIMITED.)

Our review of the Exhibition is concluded on p. 252.

FIG. 5.—ROTO-GRINDER OPERATED BY COMPRESSED AIR. (HOLMAN BROS., LIMITED.)

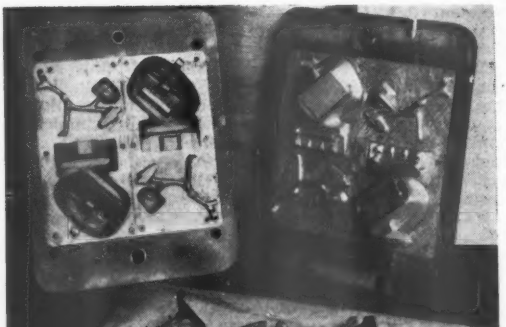


FIG. 7.—ALUMINIUM PATTERNS MOUNTED ON CAST-IRON PLATES. (G. PERRY & SON, LIMITED.)

Effect of Stripping Temperature on the Properties of Pearlitic Grey Cast Iron*

Report of Sub-committee T.S. 18 of the I.B.F. Technical Council

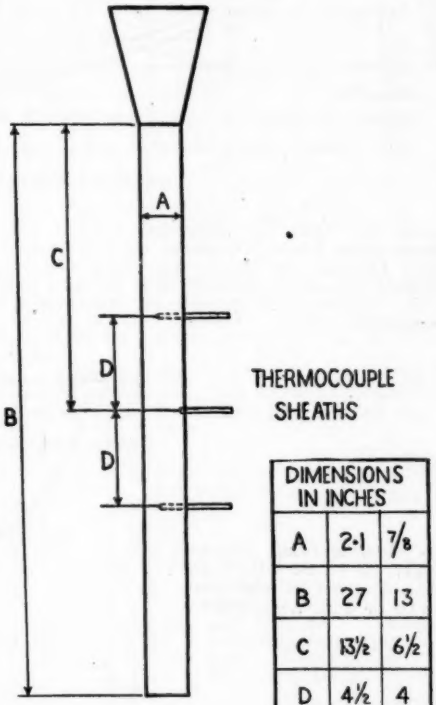
(*Continued from page* 209.)

GENERAL SUMMARY

The results described in this Report show that, on the whole, the changes in the characteristics of castings, resulting from changes in stripping temperature over quite a wide range, are not very marked. There is a clear tendency for slight air-hardening to result, when castings of medium section are stripped from the mould while still at a high temperature above the critical point. The air-hardening causes a small increase in tensile strength, and an increase of 20 to 40 points in the Brinell hardness value. Other properties tend to vary in an irregular manner, and do not always show any clear change. Stripping at high temperatures does not cause notable changes in castings of thin section, below, say, ¼ in., since in these sections the rate of cooling in the sand mould is not very different from that in still air.

The tendency for tensile strength values to be increased is not disadvantageous, but it may be doubted whether it is a practicable operation regularly to produce castings of slightly higher tensile strength merely by normally stripping at a higher temperature, and still to maintain a constant tensile strength level. The concurrent increase in Brinell hardness may be a positive disadvantage, and might lead to the necessity to reduce machining speeds on critical sections. The hardening is, of course, due to changes in the matrix of the iron, and is not of the chilling variety, which might give rise to local hard spots. Particular care would need to be taken with irons of fairly high alloy content, which, on stripping from a high temperature, might increase in hardness to a troublesome figure.

The effects of stripping at a high temperature on consequent distortion, while subject to general principles, are more complex in their operation and would have to be determined for each particular casting. Apart from the obvious danger of handling the casting while extremely hot, it does appear that a high stripping temperature reduces distortion and internal stress in a casting containing widely spaced limbs differing in their section. Where the limbs are in closer proximity, and do not differ very markedly in section, stripping at a high temperature might even lead to greater distortion. It should again be pointed out that this Report considers only those cases in which the casting is completely stripped at a given temperature, and not cases of partial stripping of a casting, thus exposing different sections to different cooling conditions.



DIMENSIONS IN INCHES		
A	2·1	⅞
B	27	13
C	13½	6½
D	4½	4

FIG. 10.—LOCATION OF THE THERMOCOUPLES IN 2.1-IN. AND ⅞-IN. DIA. TEST-BARS.

*Presented at the Annual Conference of the Institute of British Foundrymen.

Effect of Stripping Temperature

Acknowledgments

The grateful thanks of the Sub-committee are due to the firms who supplied information in reply to the questionnaire, and particularly to those firms and other bodies who provided the facilities for the considerable amount of experimental work undertaken to prepare this Report. These were:—Ferranti, Limited; The Mond Nickel Company, Limited; Prince-Smith & Stells, Limited; Qualcast, Limited; S. Russell & Sons, Limited; The Sheepbridge Stokes Centrifugal Castings Company, Limited; C. & B. Smith, Limited; and the University of Birmingham (Department of Industrial Metallurgy).

APPENDIX

Determination of Cooling Rates of Test-bars

It was necessary to investigate the cooling rate of test-bars in order to arrive at a satisfactory technique for estimating the stripping temperature by observing the time after casting. All the test-bars employed were cast vertically into oil-sand moulds and were provided with a flared feeding head of the dimensions quoted in the section on physical properties. Since there was considerable interest in the temperature distribution within a given test-bar, three thermocouples were employed. Two were placed with the hot junction on the axis of the test-bar and were located at approximately one-third and two-thirds along the the length of the test-bar, while the third couple was placed midway

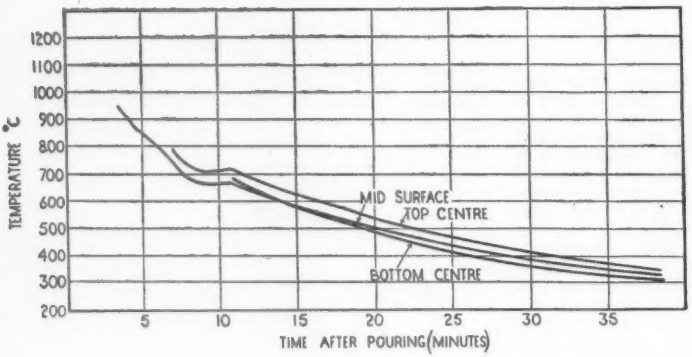


FIG. 11.—TEMPERATURE DISTRIBUTION IN $\frac{7}{8}$-IN. DIA. BARS AFTER CASTING IN OIL-SAND MOULD OF 2$\frac{1}{2}$-IN. WALL THICKNESS.

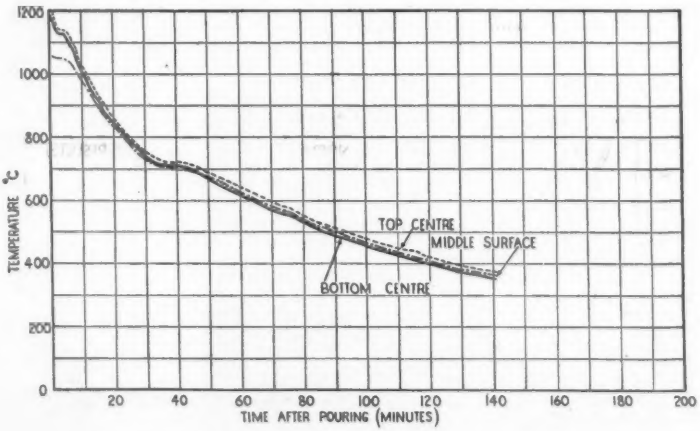


FIG. 12.—TEMPERATURE DISTRIBUTION IN 2.1-IN. DIA. BARS AFTER CASTING IN OIL-SAND MOULD OF 4-IN. WALL THICKNESS.

between these two, *i.e.*, at the centre of the length of the test-bar, but with the hot junction located at the surface of the mould. The thermocouples were always of platinum-rhodium wires, and were enclosed in thin silica sheaths 6 in. long, 0.18 in. O.D., with a wall thickness of 0.03 in. The arrangement is set out in Fig. 10. The thermocouples were connected to direct reading milli-voltmeters or to potentiometers, according to the equipment available in individual works. Readings were taken at as frequent intervals as possible, particularly in the early stages, when the rates of cooling were high. Except where otherwise stated, the pouring temperature was close to 1,300 deg. C.

The individual variables studied will be considered separately:—

(*a*) *Distribution of temperature in the bar.*

A typical set of curves obtained on a $\frac{7}{8}$-in. dia. bar cast in oil sand 2 in. thick in a grey iron containing about 3.3 per cent. carbon and 2.25 per cent. silicon, with low sulphur and phosphorus, is given in Fig. 11. It will be noticed that, of the two couples placed on the axis of the casting, the upper couple is considerably hotter than the lower over the whole temperature range. The difference in this case ranges from about 50 to 70 deg. C., though this may have been exaggerated by the fact that this particular bar was cast very hot. It will also be noted that the couple at the surface, which is naturally relatively cold in the early stages of cooling, before very long assumes a position midway between that of the top and bottom couples on the axis of the bar.

This temperature distribution is typical of all the bars studied at both sizes. Fig. 12 shows the same distribution in a bar 2.1-in. dia., cast at 1,295 deg. C.

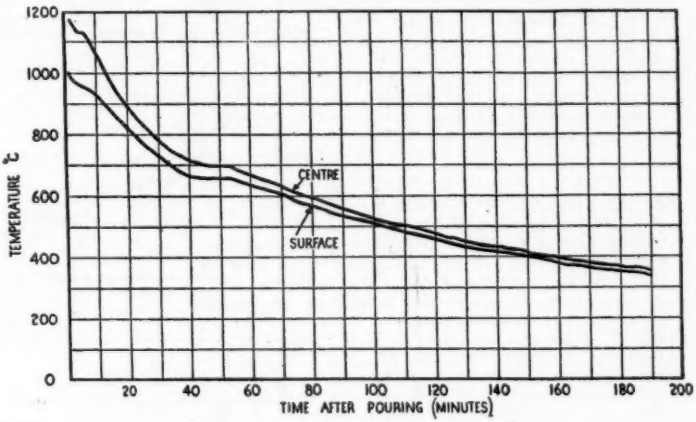


FIG. 13.—TEMPERATURE DISTRIBUTION AT THE MIDDLE OF A 2.1-IN. DIA. BAR AFTER CASTING IN OIL-SAND MOULD OF 4-IN. WALL THICKNESS.

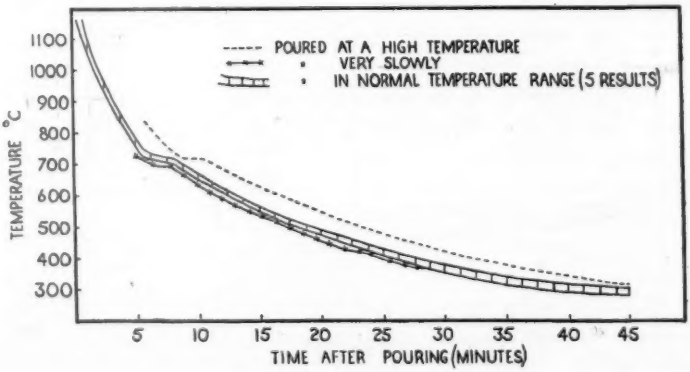


FIG. 14.—EFFECT OF POURING CONDITIONS ON THE CONSISTENCY OF RESULTS OBTAINED FOR COOLING CURVES ON $\frac{7}{8}$-IN. DIA. BARS CAST IN OIL-SAND MOULDS OF $2\frac{1}{2}$-IN. WALL THICKNESS.

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in an oil-sand mould with a wall thickness of 4 in. The iron contained about 3.25 per cent. carbon, 1.3 per cent. silicon and 0.25 per cent. phosphorus. In both sizes of bar the temperature at which the surface couple became intermediate in temperature between the top and bottom couple was at about 600 deg. C., being rather higher for the large bar than for the small bar.

The temperature distribution would appear to indicate that the gradient from the axis of the bar to the surface is very slight, though it is obvious that for theoretical reasons there must always be some temperature gradient in a uniformly cooling body. The point was investigated a little further on a 2.1-in. dia. bar by placing two couples half way along the bar, one being located with the hot junction at the axis and the other with the hot junction at the surface. The results are shown in Fig. 13, again on an iron cast at 1,290 deg. C., in an oil-sand mould of 4-in. wall thickness. This confirms that, although the temperature gradient does always exist, it becomes very small and in the order of only 10 deg. C., for temperatures below 500 deg. C. in bars 2.1-in. dia.

(*b*) *Consistency of results.*

It was found that, under similar conditions, the consistency of the results was high. Thus, in Fig. 14, plotted on ¾-in. dia. bars cast in oil-sand moulds 2½ in. thick, it will be seen that five of the results fall within a narrow band. If the pouring temperature range is extended excessively, as indicated by the two outside curves, the results may differ somewhat, but exercising

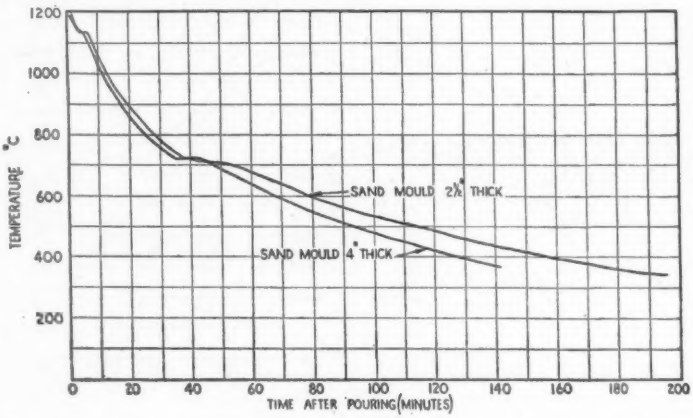

FIG. 15.—EFFECT OF THICKNESS OF OIL-SAND MOULD ON THE RATE OF COOLING OF 2.1-IN. DIA. BARS.

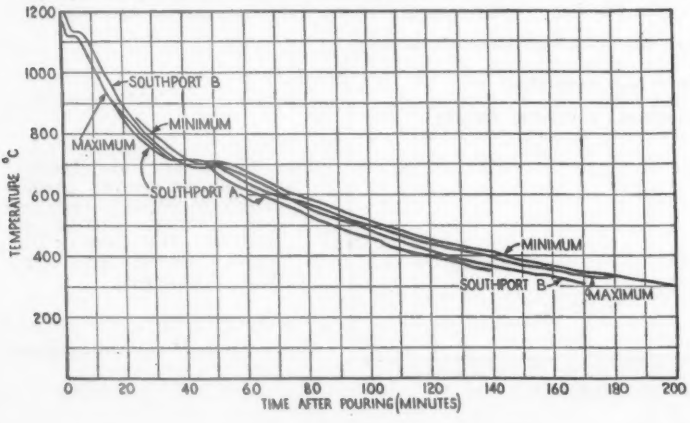

FIG. 16.—EFFECT OF TYPE OF SAND ON COOLING OF 2.1-IN. DIA. BARS CAST IN OIL-SAND MOULDS OF 4-IN. WALL THICKNESS.

reasonable precautions, it was considered possible to estimate the temperature of the bar at any moment within ±20 deg. C. A similar consistency of results was attained with 2.1-in. bars, and, as the cooling rate was slower, the accuracy was even higher, particularly in the temperature range of 800 deg. C. and below.

(*c*) *Effect of Sand Thickness.*

The influence of thickness of the sand around the test-bar was studied in the case of 2.1-in. bars, and a typical pair of results is given in Fig. 15. It will be seen from this that the sand has an appreciable heat capacity, so that a layer of sand, approximately twice the thickness of the test-bar diameter, causes appreciably more rapid cooling than a layer of sand only slightly greater in thickness than the diameter of the test-bar. This is equivalent to saying that the thermal conductivity of the sand is greater than that of reasonably still air.

(*d*) *Effect of Type of Sand.*

A certain amount of work was done on this question because of its general interest, and again was carried out on 2.1-in. diameter bars. Typical results obtained on four different samples of sand are given in Fig. 16, which shows curves obtained on General Refractories "Maximum" and "Minimum" sand, and on two samples of Southport sand. In all cases the wall thickness of the sand was 4 in. Sieve tests were carried out on the sands, though unfortunately a very close range of sieves was not available, so that the figures did not differentiate very clearly between the three sands.

It appears from these figures that the "Maximum" sand and Southport did not differ very much in their characteristics, but that the "Minimum" sand carried a higher proportion of fines. The cooling curves indicate that the finer sands tend to cause a higher rate of cooling. The Sub-committee does not regard this conclusion as final, since it is based on only a few tests. It is clear also that the distribution of the different sized particles would have an important effect as well as the actual grain size of the largest proportion of the particles.

Sieve size	Weight of sand, per cent.		
	"Maximum" sand.	"Minimum" sand.	Southport sand.
+30 mesh	1.2	2.0	Nil
30–100	84.2	66.7	89.6
100–150	11.1	27.5	10.0
150–200	2.8	3.2	0.2
–200	0.0	0.7	0.1

(*e*) *Conduction along the Bar.*

Much of the heat flow is conducted longitudinally along the bar, particularly in regions close to the ends of the bar. In one test-bar poured during these experiments, insufficient metal was available, so that the top thermocouple was only 3 in. below the top surface of the bar, no metal being retained in the feeding head. This completely disturbed the temperature distribution in the bar, and the upper couple, which is normally the hottest, actually became the coldest, due to the increased rate of cooling. The rate of cooling of the lower couple was not appreciably affected.

DISCUSSION

DR. H. T. ANGUS said it was a Report on which he could speak with interest because the British Cast Iron Research Association had been carrying out an investigation for some time, on similar lines to the work of the Committee, on the subject of cracking in light castings. When the work commenced, most people had believed that hot stripping would increase the risk of fracture, but he could completely confirm the results of the Committee that hot stripping in certain castings might reduce the tendency to internal strains and thereby reduce the tendency to spontaneous cracking. It was important to remember that this statement would not necessarily apply to *all* castings. In some respects, the most interesting part of the Report was the Appendix dealing with cooling rates.

Two Stages of Cooling

Mr. Hallett had pointed out very clearly that they had to allow for the heated layer of sand round the castings. The cooling rate of a casting from solidification had to be considered, in the case of cast iron, in two definite stages. The first was the solidification stage which determined the primary structure of the iron, and the second was the crossing of the transformation zone which affected the matrix structure. In light castings, the initial rate of solidification was primarily governed by the actual transference of heat to the sand itself, *i.e.*, the heat capacity of the surface layers of the sand. In the second stage (750 to 650 deg. C.), however, a considerable thickness of heated sand was present outside the casting which virtually increased the size of the casting and thereby lowered the cooling rate considerably. Therein lay the danger of using the volume/area ratio as an index of the over-all cooling rate of the casting. He had used that ratio and found, in small section castings, that it was quite valuable, but it was applicable only to the first solidification stage. If they calculated the cooling rates for a wide range of diameters from solidification down to transformation-range temperature, the average rate did not vary linearly with the volume-area ratio. Heavy castings cooled down more slowly than would be expected from this ratio. A great deal more work was necessary on cooling rates.

MR. HALLETT said he was sure the Committee would be gratified to hear from Dr. Angus that the work carried out on light castings confirmed their own conclusions on stripping temperature and internal stresses. It always gave a sense of satisfaction to have results confirmed by an entirely independent body. The question of volume/area ratio was one with which he was very much concerned and he agreed with Dr. Angus. The effect of the sand was obviously far more important on the transformation point and on the structure of the matrix than on the graphite distribution and size, which were determined at or close to the solidification point. The form of the matrix was determined much lower down in the temperature range, when the sand

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had had time to heat-up and the casting might behave as if it had a much greater section than it appeared to have.

A particularly interesting case was that of a tubular casting, with metal on the average of one inch thickness, cast around a core which might be three to six inches in diameter. The core heated up to the same temperature as the casting and the temperature ultimately attained would depend on the relative size of the sand core and the casting. A state of identity of temperature would occur somewhere around 700 to 800 deg. C.—exactly the temperature which was important for determining the structure of the matrix. The point might not be of great importance in ordinary unalloyed irons, but became of real importance in medium-alloy irons made to have a special microstructure where relations between structure and composition, based on test-bars, might be entirely misleading when one came to refer it to the actual castings.

Measuring the Strength of Test-bars

MR. H. J. YOUNG said that the manipulation of test-bars in order to cause them to pass stated specifications was a matter of considerable interest and this Report, possibly unintentionally, had extended the idea. Years ago, a certain foundry manufactured daily a standard cast iron which gave 14 tons tensile at the most. A high authority demanded 15 tons minimum tensile from 50 of these castings (which were mass-produced). The difficulty was overcome by moulding the test-bar with 0.25 in. of sand around it and a thick iron box around the sand. The inspecting engineer, when shown the mould and asked if he objected, said the makers could have 12 in. or ¼ in. of sand round the bar for all he cared. Obviously, this was accelerating the cooling of the iron through its critical points and was bound to increase the strength. As to whether it was *pro bono publico* to tell the world how to pass a high-tensile specification with a lower-tensile iron was a matter for conjecture. The cooling conditions of the test-bar rarely approached those of the casting. In the case of batch-produced green-sand castings knocked out hot, usually the test-bars were not so treated and had not the same kind or the same thickness of sand around them. In the case of heavy castings, cooled for days in the mould before being lifted, the test-bars might be, and often were, cast in separate moulds with nothing like the same thickness of the sand around them and nothing like the cooling period of the main casting. He thought foundrymen were a little ostrich-like on this test-bar question. Stripping castings soon after they were poured was air-quenching. Greater effects accrued from quenching in a current of chilled air or in water. The actual results obtained ran in accordance with the cooling curve of the iron in question and the rate of quenching through its arrests.

When cracking of castings occurred, as it sometimes did as a kind of plague, much could sometimes be done by paying attention to the phosphorus content. Even as little as 0.05 per cent. of phosphorus either way could cause a difference in the total wastage sustained over a period. Whilst cracking was usually due to faulty design, the ironfounder generally stood the blame. Certain straight-armed wheels, for example, might give the foundry 10 per cent. loss and the machine shops a further ten. Hence, for many years the foundryman bared the bosses, the metallurgist lowered the phosphorus, and the wheels continued to produce undue losses.

He was unable to agree with the remark on page 6 of the Report that "distortion was always due to internal stresses in a casting." He thought on the contrary that the stresses of a grey-iron casting cast in a stationary cold or warm (not hot) sand mould were located mainly in the external *as distinct from the internal* layers of metal. They appeared to him to be akin to the degree, type and direction of dendritic formation in those portions of the casting affected by the conductivity of the mould surfaces. It should be remembered that castings made in Lanz Perlit hot moulds (at 400 deg. C. or more) were not only free from such dendrites but also from the casting stresses. Further, there was the fact that an individually-cast piston ring (namely, a four-sided casting, the surfaces of which cooled instantaneously against its green-sand mould) was under great stress while in its as-cast condition, which stress was largely, if not entirely, removed by light machining.

Edge chill was an interesting and costly phenomenon which occurred on certain castings knocked-out hot and which did not matter unless the castings were machined in such a manner that the edge of the cutting tool was brought constantly in what might be described as impact-contact with the edges of the casting. Under such conditions tool-life was shortened appreciably by the presence of this edge chill.

Identical Cooling Rate

MR. HALLETT was sure they would at least all agree with Mr. Young that there was much further work to be done. He thought that the British Standards Specification 1452 laid down that the test-bar must be cast under the same conditions as the casting which it represented. Mr. Young might have been lucky in the type of inspector he had had to deal with. This effect was perfectly straightforward and the point was that both casting and test-bar had to have the same rate of cooling.

The point about phosphorus and cracking was very interesting and he would like to hear a little more about it, particularly to have some quantitative data.

Concerning internal and external stresses, he thought they were dealing purely with a question of nomenclature. If one applied a stress to a casting, whether it was applied externally or internally the relation between stress and strain would be exactly the same for a given stress in a casting. The difference between internal and external stress was not so much that they were different in themselves, it was merely how they were applied. Inside the casting they were all the same

and he thought the relation between stress relief and distortion should be the same. Mr. Young was probably right in saying that the stress due to heat contraction was an external stress, but it was also present as part of the casting and therefore it was classed as an internal stress. "Internal" did not mean right in the centre of a given section.

Two Degrees of Hardness

On the question of edge chill he doubted whether Mr. Young's remarks confirmed the phenomenon. Was the edge really chilled? They had to consider the differentiation between two hardnesses which were due to different causes. Chilling was the formation of carbide as the result of quick cooling at or near the solidification point. Obviously it did not matter what they did to the casting subsequently in the way of stripping; they would not alter the graphite structure which had been set up at or near the solidification point. What they might do was to impose large changes in the matrix and the over-all hardness of the iron would be altered. Hot stripping might superimpose a hardening effect due to an alteration in the matrix to an iron already at a relatively-high hardness level because of fine graphite and the two hardening actions taken together might raise the Brinell value to a level which would cause some difficulty in machining. Nevertheless, the result should not be termed edge *chilling*.

Ferrite Segregation with Heavy Castings

MR. R. LEE was very pleased to have heard what both Mr. Young and Mr. Hallett had said. His experience indicated that the alleged hardness experienced on machining small castings was not necessarily due to chill, but might also be due to ferrite segregation.

He was not generally associated with mechanised foundrywork, but was mainly engaged with the manufacture of very heavy iron castings. At one time their machine shop used to complain of difficulty in machining certain heavy castings due to alleged hardness. It was not until a 120-ton casting was examined that they appreciated the justification of the complaint, because, in order to obtain a sample across one of the corners, half a dozen saw blades were used for a ½-in. specimen. First thoughts suggested a chilled skin, but their experience as roll-makers indicated that such a skin was impossible.

Metallographic examination showed, that for a depth of approximately ¼ in., the surface of the casting consisted essentially of a ferritic rim containing manganese sulphide segregates in varying amounts. Behind the ferritic rim, a pearlite zone free from graphite was evident, which merged into a band of phosphide segregation. This was followed by the normal graphite-ferrite-pearlite structure.

The following shows the variation in composition of the general mass of the casting and the skin:—

	T.C. per cent.	Si. per cent.	Mn. per cent.	S. per cent.	P. per cent.
General mass ..	3.20	1.20	0.60	0.070	0.28
Skin	0.28	1.28	0.80	0.400	0.39

A 60-ton casting of similar type from the same works exhibited the same structure at the surface, as did also a cylinder 9 ft. long, 4 ft. 6 in. dia. with a wall thickness of 4½ in., made in another of their foundries. The width of the ferritic rim increased with the heavier castings.

Smaller castings approximately 30 to 40 tons in weight made by a different method in yet another of their foundries did not provide the same difficulty in machining, although a ferritic skin was present. In these cases a sulphur content of the skin was only about 50 per cent. greater than that in the interior. Investigation indicated the high sulphur figure in the first case must be attributed to the mould-drying technique. In the one foundry the top part was almost sealed before drying operations commenced, so that the hot gases had to find their way out through the mould face to the vents, thus giving rise to excessive sulphur absorption by the mould face, whereas, in the other foundry, adequate spacings were left between the top part and the mould to permit easy escape of gases.

Later, a mechanised foundry attached to the organisation was in trouble regarding the machining of some small castings. Metallographic examination showed ferrite segregation at the surface. Bearing in mind the experience with the heavy castings, the management concluded the high stripping temperature resulted in surface oxidation and consequent de-carburisation, whereby the soft ferrite so obtained tended to flow and build-up in front of the tool. Rightly or wrongly, a lower stripping temperature eliminated the trouble.

It was with this in mind he directed criticism against the Report. The conditions under which Mr. Hallett had produced his test-bars differed in one essential from conditions normally found in mechanised foundries. From what he had seen, castings from the knock-out were thrown into a pile. The resultant effect of the slower cooling as compared with their being allowed to cool separately would accentuate the tendency for de-carburisation to take place. Hence to correlate test-bars with castings, he suggested the test-bars should also have been thrown on a pile of stripped castings. He wondered if his experiences would account for some of the anomalies noted by Mr. Hallett.

Large Castings not Considered

MR. HALLETT said Mr. Lee's comments were of considerable interest. They on the Committee had no opportunity whatever for dealing with castings weighing 120 tons and he thought they had not got as far as castings weighing 120 lb. He did not think the type of effect that Mr. Lee had described, *viz.*, surface de-carburisation and oxidation, arose in the case of their test-bars. In very large castings, it was obvious that the surface remained at a temperature at which one could get scaling and de-carburisation and the periods were so much longer that he did not think the two experiences were parallel at all. Certainly the anomalies in the high-alloy iron were not due to any surface effects because the test-pieces were machined from the centre of the bars and he knew the test-bars were not de-carburised even on the surafce.

Mr. Lee was right in saying that the practice of mechanised foundries was very often to throw the cast-

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ings on a pile, and under such conditions they would get different stress distribution from those where a casting was cooled freely in air. Nevertheless, in the case of their test-bars, the Sub-committee felt it definitely necessary to work in the simplest conditions. There were far too many variables in problems of that type to try to search them all out in one investigation. He did not think it would have been very suitable to throw their test-bars on to a pile of castings of falling temperature, subject to all sorts of conditions, because they would simply have been adding quite indeterminate factors to a position where there were already far too many. Therefore they took the simplest case and cooled their test-bars in air.

Difficulty in Machining

MR. LEE said the point he was making was that they had experienced trouble on machining small castings when the hardness at the surface was definitely less than the interior according to indentation hardness tests. He would like to know if Mr. Hallett could tell them why the skin should be softer unless it were due to decarburisation.

On reading the Report, he was rather surprised to find that machining had been passed over so easily. He thought other people must have had the same experience as himself, and was interested to know if any had attributed difficulty in machining to any cause other than chill.

MR. HALLETT replied that the Committee had had no case of a parallel type. The machinability of the casting on the outside appeared to be worse because of greater sand contamination or something of that sort. in any case, if the oxidation had proceeded to the extent of elimination of the graphite, then one might expect some decrease in the machinability.

Wider Applicability Desired

MR. H. HAYNES, referring to certain conditions of skin, said he had to provide good castings free from cracks. One such casting was 28 ft. long and 7 ft. deep. It ran from ¼ in. thick to 6 in. thick at the bottom. It took eight days to dig out, involving cooling down at the ¼-in-thick end four days before the 6-in.-thick part was exposed. He would like to know, using the test-bar, how to deal with such castings to stop them from cracking where they took so long to handle. Inside the body of the castings there were heads of metal running from 18 in. to 14 in. wide, and 3 in. thick. The casting was about 5 ft. wide and inside there was a thin limb of metal. This gave rise to conditions in which one could not duplicate with a test-bar. Experience had shown that it was best to allow the castings to cool down at the rate of a ton a day.

MR. HALLETT thought Mr. Haynes was obviously expecting too much from the sub-committee at that stage. They had merely set out to start exploring the field, and he certainly did not feel himself to be in a position to be able to answer at the moment questions relating to all types of castings. One could help things along in certain cases by accelerating the cooling of the heavy sections, but he could not say anything useful to Mr. Haynes in his extreme case. Possibly when they had Mr. Haynes' written description of his problem to submit to the Sub-committee meeting, they might be able to give him some general recommendations but it could not be on the basis of the Sub-committee's experimental work to date.

Varying Metal Composition

MR. D. FLEMING said in Figs. 6, 7, and 8, showing the relation between time of casting and stripping and the strain produced in the casting it would appear that in each case the gap maximum was about 2 mm. Could Mr. Hallett tell them if the results in those three cases were all obtained at about the same time in the same foundry, because one came back to the problem of varying metal composition and its effect on the strain developed. He was asking the question from the practical viewpoint and not from extensive technical knowledge of the problem.

In this foundry was made a certain casting which presented a problem. They made it with the sand as dry as was reasonably possible, with the casting temperature measured in every case and with everything possible done to control variations, but they felt that the metal composition had an effect and that their furnace melting behaviour also had an effect, because the amount of cracking they experienced was not constant, however carefully they controlled the melt. They had cracks in batches and they could not quite find the reason. When castings cracked they did not all open up by the same amount. In some cases there were, obviously, severe increases in internal stress. They felt there was something other than just the melting conditions affecting the results. They would be glad of any information having a bearing on variations found in stress produced in similar castings.

MR. HALLETT said he would reply briefly: the iron referred to in Figs. 6, 7, and 8, was cast in the same foundry and each series came from the same ladle of metal cast at the same time so that any one series was completely comparative, although the three series were admittedly prepared at different times.

Varying Times in the Mould

MR. D. MARLES, referring to Figs. 6 and 7, asked if Mr. Hallett could tell him why series (1) and (2) on those two graphs, presumably between the same composition ranges showed different times in the mould to attain the same gap width? In the case of Fig. 6 it was four minutes and in Fig. 7 it was two minutes. Was it a function of the temperature of pouring, and if so was the temperature taken?

He was pleased to see that the second part of the work was having further investigation by another committee, but he was sorry to observe that they said that the first part was completed. On the whole he thought it rather sketchy. There were two curves for tensile strength which were substantiated by five different points each; these gave an effective indication for a

couple of compositions. With the alloyed iron, the curve was very scattered and apparently no attempt had been made to investigate why. He wondered if that work could be continued under another committee.

The other question he would like to ask was: In the first work an increase was noticed in tensile strength; was that solely attributed to stripping at a high temperature? Were any of the test-bars stress-relieved to determine whether it was a question of the rate of formation of pearlite or whether it was purely a question of the increase of internal stresses in the test-bar due to a greater cooling rate?

MR. HALLETT replied he thought it would be fairest to say that the difference between Figs. 6 and 7 was rather due to the relative inaccuracies of the method, and he preferred to attach more importance to the strain-gauge curves as giving a more accurate result on the bars. They agreed that the work was by no means complete. It did not cover all compositions or anything like all compositions. They felt merely that it gave an indication that one got an effect; that the effect was not very marked, and that in general the average foundry did not have to worry very much about it. If any foundry was particularly interested in any particular composition then it was up to that foundry to determine its own problems on the lines already stated. He rather doubted whether the problem was worth investigating in greater detail, as by a concerted effort from that Sub-committee. There were no data on the residual stress in the test-bars so he could not throw any light on the points raised. Certainly none had been stress-relieved.

American Viewpoint

MR. V. A. CROSBY, the well-known American metallurgist, said he had enjoyed the Report very much because they had run into the problem a great deal in America, particularly since foundries had become mechanised and with the unusually high rate at which they were working, necessitated by continuous operation. He passed it along for their consideration, that there was a strong tendency in America to anneal all small castings because with any conveyor system they had found it too difficult to try and control the structure to produce anything that could be called uniform for machineability purposes. It was much more efficient to anneal all those castings than to attempt any procedure that they knew would work if they could do it in a small way.

The second question he had was: Mr. Young mentioned the reduction of phosphorus to eliminate cracking. They always talked about the reduction of phosphorus to eliminate porosity. He would be interested to know the size of casting and the phosphorus range to which reference had been made.

MR. HALLETT said he was sure the Sub-Committee was very pleased to have Mr. Crosby's remarks from the other side of the Atlantic. It was very interesting to have his information on the use of annealing in mechanised systems as a means of ironing-out the difficulties which one got from different cooling rates. There was only one comment he would make. It was all very well if they were dealing with castings which had not to withstand applications where wear resistance was required. Machinability would be greatly improved with a ferritic structure, but wear resistance would be correspondingly decreased.

MR. YOUNG, in answer to the additional question from Mr. Crosby, said that his remarks upon phosphorus referred to jobbing irons possessing phosphorus between 0.45 and 0.75 per cent according to the type of castings being handled by the foundry. He would, however, be prepared to say that the phosphorus could be too low, as the resilience of some cast irons depended upon the presence not the absence of phosphorus, which was something everyone in the sand-cast piston ring trade must have observed. None of these remarks was a criticism. All were but small contributions selected from his own experiences in hope that they may add to an interesting Report.

THE CHAIRMAN (Mr. J. J. Sheehan) thought the question of phosphorus was a complicated and difficult one. It was very complex in its effect. He would mention a fact of which Mr. Crosby was perhaps unaware—the general castings in the United States had below 0.3 per cent., while many British castings had more than that figure. He assumed from the hearty applause already given that it was intended as a vote of thanks to Mr. Hallett for the presentation of a very interesting Report.

B.E.A.'s Large Orders

The British Electricity Authority has placed orders for transmission line and transformers for an experimental section of a system that will reinforce the existing 132-k.v. grid. The nominal operating pressure will be 275 k.v. and the transformers will be 3-phase units of 120 m.v.a. capacity, auto-connected for a voltage ratio of 275/132 k.v. with no tappings. In spite of their large size they will be capable of transport from works to site with no more than the usual amount of dismantling.

Two transformers have been ordered, one from the British Thomson-Houston Company, Limited, for installation at the Staythorpe Power Station, near Newark, the other from the English Electric Company, Limited, for installation at West Melton, near Sheffield.

Latest Foundry Statistics

The July Bulletin of the British Iron and Steel Federation reports a further decline in employment in iron-foundries. During the week ending June 4 there were 147,061 people employed, as against 147,776 a month earlier. This net loss of 715 is made up of 737 males and a gain of 22 females. In steelfounding, 19,291 were employed as against 19,532, a decrease of 241, made up of 191 males and 50 females. The output of metal melted for steel castings was less in June than May. The average weekly melt was 7,900 tons as against 8,800 tons.

Personal

MR. C. W. HAWKINS has been made a director of Dover Engineering Works, Limited, Dover.

MR. S. G. GRIFFITHS has been appointed a director of the Midland Iron & Hardware Company (Cradley Heath), Limited.

MR. ERNEST MCCULLOCH, welfare officer of Birmid Industries, Limited, Smethwick, has retired after 43 years' service with the company.

MR. A. P. QUARRELL, a director of Associated British Oil Engines, Limited, has been appointed a director of British Oilfield Equipment Company, Limited.

MR. A. W. CRAWFIELD and MR. C. MEAD have been appointed additional directors of the British Tabulating Machine Company, Limited, Letchworth, Herts.

MR. F. W. L. TINCKNELL and MR. A. E. DUMENIL have been appointed to the board of Christy Bros. (Chelmsford), Limited, manufacturing electrical engineers.

MR. HARRY PALMER has retired after 62 years' service with Newton, Shakespeare & Company, Limited, aluminium hollow-ware manufacturers, of Birmingham.

MR. J. R. LAMBERTON has been appointed a director and MR. J. M. LAUDER, secretary, of the Mirrlees Watson Company, Limited, engineers and founders, of Glasgow.

MR. H. V. STAMMERS, managing director of the British Tabulating Machine Company, Limited, Letchworth, Herts, has been appointed a deputy member for England and Wales of the Road and Rail Appeal Tribunal.

MR. B. V. MAHABALE, B.Sc., foundry superintendent of the Mysore Kirloskar, Limited, Harikar, Mysore, India, has arrived in this country and is staying at the Waverley Guest House, 14, The Mount, Altrincham, Cheshire.

MR. BRUCE L. P. RUSSELL, engineer and manager at the Edinburgh works of Johnson & Phillips, Limited, manufacturing electrical engineers, has been adopted as Progressive candidate in the forthcoming municipal by-election in the city.

LORD FORRESTER, who has been appointed as a part-time member of the North Thames Gas Board, is managing director of Enfield Cable Works, Limited, and a director of Enfield Rolling Mills, Limited, South Wales Metal Refiners (1941), Limited, and other companies.

MR. FREDERIC R. M. DE PAULA, O.B.E., F.C.A., has been appointed a director of the Brush Electrical Engineering Company, Limited. His other directorships are English, Scottish & Australian Bank, Limited; Powers Accounting Machines, Limited; Electrical & Musical Industries, Limited, and Torquay Hotel Company, Limited.

MR. R. L. CHANTRILL, on his return from India, has been appointed chief technical engineer of the British Thomson-Houston Export Company, Limited. He has had long experience of project work, and for some years was a director and chief engineer of Associated Electrical Industries (India), Limited, which position he has now relinquished.

MR. G. R. MARSH, hitherto sales director, has now been appointed assistant managing director of A. C. Wickman, Limited. He has been connected with the engineering industry since 1912, and is a well-known figure in machine-tool circles in this country and on the Continent. Mr. Marsh joined the company in 1934 and was made a director in 1940.

Obituary

MR. ROBERT STEIN, late of G. & J. Weir, Limited, engineers and founders, of Glasgow, recently.

MR. CYRIL PAYNE, who died on August 10, was a director of Dawson, Payne & Elliott, Limited, brass and ironfounders, etc., of Otley, Yorks.

MR. ISAAC BAKER, blast-furnace manager of the Staveley Coal & Iron Company, Limited, Chesterfield, for 33 years, has died at the age of 89.

MR. J. H. CRUMP, a former secretary of Samuel Thornley, Limited, manufacturers of hardening compounds, of Birmingham, died on August 10 after a short illness.

MR. F. J. NEALON, South African representative for the English Steel Corporation, Limited, Sheffield, has died in a London hospital. Mr. Nealon, who was manager of Vickers & Metro Carriage (S.A.), Limited, Johannesburg, was on a business tour in Britain.

MR. J. B. W. HIRD died on August 14, at the age of 77. Formerly a director of Hall & Stells, of Keighley, when this firm amalgamated with Prince Smith, Limited, in 1931, to form Prince-Smith & Stells, Limited, textile machinery manufacturers, Mr. Hird became secretary of the new concern, in which capacity he remained until his retirement in 1945.

MR. JOHN BANKS, a well-known local industrialist, has died at Darlington at the age of 84. Mr. Banks was formerly works manager and a director of the Darlington Forge, Limited, until it was taken over in 1932 by the English Steel Corporation, Limited. He had been a director of the Darlington Railway Plant & Foundry Company, Limited, and was for some time a director of George Denham & Company, Limited, engineers and ironfounders, of Darlington. He was also a local representative of the North-East Coast Engineering Employers' Association.

DR. GEORGE STEPHEN BAKER, who died recently at the age of 71, was the first superintendent of the William Froude Laboratory of the National Physical Laboratory at Teddington. His appointment was made in 1910 when a tank for experiments with ship models was provided through the generosity of the late Sir Alfred Yarrow. Consisting both of general research on problems of ship resistance and propulsion and of tests with models of specific ships proposed for construction by shipowners and shipbuilders, the work carried out under his direction at that tank and at a second tank added by the Government in 1932 had a very considerable influence in improving the design and performance of vessels of all kinds. Dr. Baker retired in 1942 on reaching the age limit. He was then appointed a temporary scientific officer on the staff of the laboratory.

Cupola Backstage*

By C. Astling

The efficient operation of a general ironfoundry depends on the production from the cupola of fairly large quantities of hot metal, of a composition suited to the castings being produced. Of recent years, much thought has been devoted to the improvement of melting conditions in the cupola, and there has been published a large amount of literature on this subject. Comparatively little has been said, however, on the layout of the pig-iron stockyard, which forms the starting point in any scheme of cupola operation and control. This Paper is designed to show how a scheme can be applied to one particular type of foundry. Obviously, a similar arrangement could be applied to any shop, bearing in mind the particular needs concomitant with the work being produced and the space available.

In any foundry, there will be a considerable quantity of cast-iron scrap in the form of runners and risers, etc., together with some defective castings. The relative proportions of these will vary according to the type of casting which the foundry is producing, but considering a foundry making castings ranging from a few pounds to several tons, the total proportion of scrap will be about 30 per cent. From the metallurgist's viewpoint it will be desirable to use a quantity of steel scrap amounting to at least 10 per cent. of the total charge. Considering, therefore, the grades of pig-iron constituting the remaining 60 per cent. of each charge, these should be of a sufficiently wide variation in composition to permit of a range of mixtures to suit the types of casting being produced, but on the other hand should not be so many as to require either extensive space for storage, or a large number of different types of pig-iron in the same charge. Generally, it will be found that five sorts of pig-iron, as shown in Table I, will suffice for all mixtures required, together with suitable admixtures of scrap, steel and, if necessary, alloys.

TABLE I.—*Pig-irons Required.*

Reference.	Type.	Composition, per cent.		
		Si.	P.	T.C.
A	General duty (forming main stock)	2.5	0.3	3.3
B	Refined	1.5	0.3	2.8
C	Phosphoric	3.0	1.2	3.3
D	High Si hematite	2.5	0.05	4.0
E	Low Si hematite	1.5	0.05	4.0

Efficiency in any operation may only be attained if details are kept as simple as possible. In this scheme, the emphasis has been placed on one type of general-purpose pig-iron, referred to as "A," which forms the basis of all charges, the other four pig-irons being used in small quantities to give different results, or as control factors in the main mixture. Provision must be made for storing these different varieties in distinct stacks so that no confusion can occur between pigs which are outwardly of similar appearance.

Furthermore, it should be possible to split-up the main pig-iron "A" into low, normal, and high silicon. Clearly all the trucks received will not be 2.5 per cent. silicon. A great majority will fall between 2.4 and 2.6 per cent., but there will be a few between 2.2 and 2.4 per cent., and also some as high as 2.8 per cent., and the use of these indiscriminately will put the resulting mixture out of the required silicon range. Of the other pig-irons, there will not be more than two or three trucks of each in stock at the same time, and

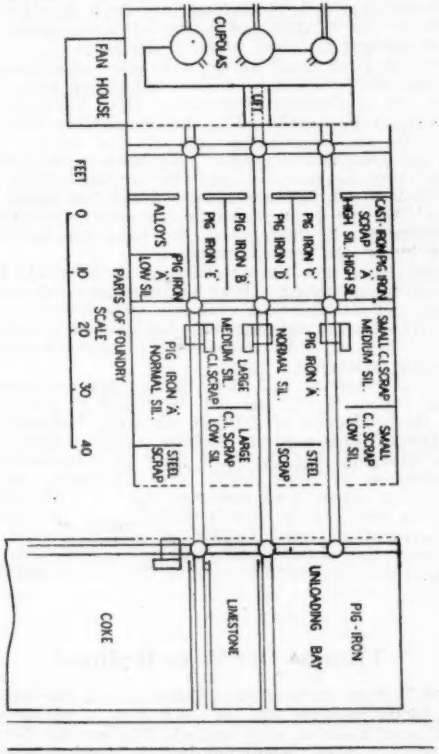


FIG. 1.—LAYOUT SUITABLE FOR FOUNDRY WITH DAILY OUTPUT OF 10 TO 15 TONS.

*A prize-winning entry for a Short Paper Competition organised by the East Midlands Branch of the Institute of British Foundrymen.

Cupola Backstage

these easily may be stacked so as to avoid confusion. Fig. 1 shows a layout suitable for the type of foundry under consideration which has a daily output of ten to fifteen tons. It will be seen that there are three cupolas with mechanical charging by means of narrow-gauge trucks and a vertical conveyor. The following important conditions have been observed:—

(1) The main pig-iron "A" has been split up into stacks, so positioned as to minimise movement of charging trucks whichever cupola be in use.

(2) Cast-iron scrap has been split into three sections:—(*a*) Small scrap, subdivided in medium- and low-silicon content; (*b*) large scrap, similarly subdivided, and (*c*) soft scrap, which forms a relatively small proportion of the total, it being restricted to thin-section material.

(3) To enable foundry scrap to be removed easily to the pig yard, a roadway has been provided, so placed that it does not hinder charging, while it is yet conveniently close to the scrap heaps.

(4) A large space has been left, for unloading pig-irons, next to the main railway siding and away from the site of charging operations. Once unloaded, the pigs may be transferred to the main stacks when the cupolas are not running.

(5) Coke and limestone have been stored next to the siding so that they may be unloaded easily and require no further movement. It will be noted that the coke has been placed in a position most advantageous to the charging of the large cupolas; these use by far the greatest quantity.

(6) In no case during charging do the trucks have to cross the siding. Thus the movement of wagons does not interfere with charging operations.

(7) Sufficient weighing machines have been arranged so as to cut down movement as much as possible during making-up a charge.

It is suggested that these factors are necessary in any cupola layout and will be found of great help in the production of uniform mixtures. Not only are materials kept separate and in positions convenient for charging, but the yard itself is independent of movement of other traffic, thus facilitating speedy charging, which is an important feature if the height of the metal in the cupola stack is to be maintained at a constant level. Further schemes of control, involving the cupola itself, may be applied with the knowledge that there is a sound basis upon which to work.

Chrome Ore Price Reduced

The selling price of Baluchistan chrome ore was reduced last week by 10s. per ton to £11 1s. 9d. per ton, delivered direct ex ship, and £11 17s. per ton for deliveries ex store. The price includes carriage charges to rail point nearest to consumers' works. The Ministry of Supply states that the reduction follows decreases in the freight rates from India.

South African Foundry Industry

Mr. W. Tait's Visit

At the conclusion of a tour of the South African foundry industry, Mr. W. Tait, technical director of Stone-Wallwork, Limited, London, was interviewed by a representative of the "Engineer and Foundryman." To him, Mr. Tait said he had visited a number of foundries in the Union which could be taken as a fair cross-section of the South African foundry industry. He had been very impressed by what he had seen. South African foundrymen had happily not met with adversity to the same extent as their colleagues in Britain, but they did not have everything their own way, and they were certainly not afraid to tackle the most difficult of problems. They displayed a great deal of ingenuity, and most of them were very progressive in their ideas. The remarkably good castings produced indicated that they certainly knew their job. With its fate in the hands of men such as these, South Africa's industry would assuredly expand on very sound lines.

Mechanisation

Discussing foundry mechanisation, Mr. Tait expressed the opinion that South African foundrymen could benefit by the mistakes that had been made in Britain. He pointed out that many British concerns had rather gone to extremes by introducing mechanisation on too big a scale, and as a result some of these foundries had created many complex problems for themselves. They were experiencing difficulty in keeping their plant and employees occupied on an economic level.

The value of mechanisation was largely lost if any part of the plant stood idle at any time during normal working hours. Mechanisation had to be studied very carefully by foundrymen, and it must be approached in the realisation that over-mechanisation was as bad a state of affairs as under-mechanisation.

He personally felt that the answer to the question for South African foundries was to be found in the principle of small-unit mechanisation, which could be applied with advantage in any shop where it was possible to put patterns on to pattern plates.

Apprentice Problem

From what he had seen on the Reef and elsewhere in the Union, Mr. Tait formed an impression that South Africa was experiencing as much difficulty as England in securing apprentices for the skilled work of the moulder. One reason for this was that moulders were often called upon to carry out such arduous tasks as shovelling sand and ramming-up moulds. One way to solve the problem was to treat the moulder as a skilled worker, which he was. Steps should be taken to ensure that the moulder devoted all his time to the skilled work for which he was trained. Jobbers and sand shifters should be taken on with this end in view.

It appeared to him that there was tremendous scope for the highly-skilled moulder in the Union. To meet the necessity for unskilled man-power, the country had the advantage of being able to utilise local labour, so that it should not be difficult to solve the problem.

Bronzing of Brass*

By Pierre Tyvaert

The tests hereafter described have been carried out on 67:30 brass castings; 16 different bath compositions have been tried out, and Table I details those which have given worth-while results as to colour and adherence on the alloy used. The tints obtained in practice varied from violet-rose to black, except, of course, samples numbered 2*a*, 2*c* and 14, which showed tints resembling that of the sample casting. The operating technique used was as follows:—

Preliminary Surface Preparation

Preparation of the surface consists (see notes in the table) as either degreasing, followed by an acid pickle, or cleaning by emery cloth. The former includes the following operations: (*a*) degreasing by immersing for 10 minutes at a temperature of between 80 and 100 deg. C. in a five per cent. solution of caustic soda—made by dissolving 50 gms. of flake caustic in a litre of water; (*b*) rinsing in running water; (*c*) pickling by immersing for five mins. in a nitric acid (1:50) bath constituted by adding 20 ml. of ordinary nitric acid (36 deg. Baumé) to a litre of water; and (*d*) rinsing in running water.

As to cleaning by emery cloth (medium grade), it could be usefully replaced in workshop practice by scratch-brushing by means of a brass-wire brush mounted on a polishing bench. Such an operation could with advantage be followed by a degreasing operation of the the type indicated.

Final Surface Treatment

This consists in simply immersing the casting, attached by a length of brass wire or a piece of string (to avoid the formation of galvanic action which would be set up by contact with a second metal), in one of the baths, the compositions of which are set out in the Table, and by conforming to the temperature and time conditions indicated. This is followed by thorough rinsing in running water.

Drying

This can be carried out by rubbing with a rag, or, under works conditions, by rubbing the castings in clean, dry sawdust.

The following points should be noted:—

(1) The production of a patina by chemical means is always a delicate operation, as the results obtained can vary markedly as a result of various factors and above all according to the chemical composition and structure of the metal. Stress should be laid on the preliminary preparation of the surface, which must be very carefully carried out. This having been done, it is essential to manipulate the casting so as to avoid all direct contact with the hands. Grease films stop the surface transformations and bring about the risk of uncoated areas.

(2) Consideration must also be given to the deterioration of the bath through use and the employment of an adequate volume in regard to the number and size of the castings to be treated. No precise figures can be given, but it is estimated, by way of example, that for pattern letters about 2¼ in. high, a minimum of 100 ml. of liquid per letter treated should be used.

(3) If the castings so bronzed should be exposed to an outside atmosphere, as a precaution, the surface layer may be conserved by immersion or by brush-painting with a layer of colourless lacquer to act as a protective coating.

* Translated from "Fonderie."

TABLE I.—*Bronzing Methods for Brass Castings.*

Composition of bath.	Sample No.	Surface preparation.	Immersion.		Tint obtained.
			Time.	Temperature, deg. C.	
Crystalline copper nitrate, 150 gm. Pure ammonia (22 deg. Baumé), 160 ml. Water, 150 ml.	2*a* 2*b* 2*c*	Degreasing and pickling " " " Emery cloth "	15 min. 1 hr. 15 min.	25 25 25	Blackish-brown. Black. Blackish-brown.
10 per cent. ammonium sulphide solution†	4	Degreasing and pickling	1 hr.	25	Bluish-black.
Purified sodium sulphide, 12 gm. Water, 1 litre	5	Degreasing and acid pickle	16 min.	80	Violet-orange.
Crystalline neutral lead acetate, 75 gm. Crystalline sodium hyposulphite, 50 gm. Water, 1 litre	14	Emery cloth	30 min.	80	Brown.
Crystalline neutral lead acetate, 12 gm. Crystalline sodium hyposulphite, 40 gm. Crystalline copper sulphate, 12 gm. Water, 1 litre	15*a* 15*b* 15*c* 15*d*	Degreasing and pickling " " " Emery cloth " " " "	3 min. 10 min. 4 min. 2 hr.	75 to 80 80 60 to 70 25	Violet-rose. Violet iridescences Brownish-yellow. " "

† The commercial ammonium sulphide solution is normally 20 per cent.; it is therefore sufficient to dilute it by half.

A Green Core Strength Accessory

The Harry W. Dietert Company, of Detroit, has designed a green core strength accessory, which improves the accuracy of the green compression test on the relatively weak core sand. It is readily attached to the Ridsdale-Dietert universal sand strength machine. The loading is applied at a controlled rate

FIG. 1.—GREEN-SAND CORE STRENGTH ACCESSORY.

by the regular motor drive or by hand wheel. The specimen is stripped directly on the accessory, thus reducing the air-dry time and assuring perfect seating on the support post. Breaking strength is found by multiplying the green compression scale reading by ten. This new accessory is not yet available in Great Britain through Ridsdale & Company, Limited, of Middlesbrough, the Dietert's representative.

Metallurgy"; and (if time permits) (4) jointly: W. A. Baker and A. P. C. Hallowes: "The Elimination by Lithium of Bismuth Embrittlement in Deoxidised Coppers and Copper Alloys"; and A. P. C. Hallowes: "The Embrittlement of Tough-pitch Copper by Bismuth."

Further details of social events and sight-seeing excursions included in the programme are contained in a well-illustrated booklet obtainable on application to the secretary at 4, Grosvenor Gardens, London, S.W.1.

Institute of Metals

Technical Sessions in Paris

By invitation of the *Société Française de Métallurgie* and the French Non-Ferrous Metal Industries, the 1949 Autumn Meeting of the Institute will be held in Paris. The meeting will be in two parts. Part I will take place in Paris from Monday, October 3, to Saturday, October 8, and Part II, consisting of tours outside the Paris area, will commence on Sunday, October 9, or Monday, October 10 (see our issue of July 28).

At the same time, and in the same building, the annual meeting of the *Société Française de Métallurgie* will be held, and these two conferences will provide excellent opportunities for French, British and other members to meet each other in most agreeable circumstances. Care will be taken that the non-ferrous sessions of both societies do not clash. The meeting of the *Société Française de Métallurgie* will open at 10.0 a.m. on Monday, October 3, when Dr. R. Seligman will deliver an address in French. Members of the Institute are invited to be present. The following is the programme for the technical sessions:—

Monday, October 3.—8.45 p.m., Twenty-seventh Autumn Lecture by Professor Georges Chaudron on "Recent French Work in the Field of Light Alloys," at the Maison de la Chimie, 28, rue St. Dominque, Paris, 7.

Tuesday, October 4.—Discussion of the following Papers:—(1) Jointly, J. Matter and M. Lamourdedieu: "The New Factory of the Société Centrale des Alliages Légers at Issoire (Puy-de-Dôme) for the Working of Light Alloys"; and W. J. Thomas and W. A. Fowler: "Some Technical Problems Influencing Production Economy in the Rolling of Aluminium." (2) W. I. Pumphrey and D. C. Moore: "Some Effects of Silicon on the Tendency to Cracking in Aluminium-copper-magnesium Alloys of High Purity."

Wednesday, October 5.—Discussion of the Papers: (1) A. M. Portevin and M. Dannenmuller: "Segregation and Liquidation in Alloys and their Application to Non-ferrous Metallurgy"; (2) G. R. Wilms and W. A. Wood: "Mechanism of Creep in Metals"; (3) W. A. Wood and W. A. Rachinger: "Crystallite Theory of Strength of Metals"; and (if time permits) (4) G. E. Bennett and R. M. Davies: "An Experimental Investigation, by a Dynamical Method, of the Variation of Young's Modulus with Temperature."

Friday, October 7.—Discussion of the following Papers:—(1) Jointly, R. Chadwick and W. H. L. Hooper: "Observations on the Re-crystallisation Characteristics of Aluminium-magnesium-manganese Alloys"; and R. Chadwick, T. Ll. Richards and K. G. Sumner: "The Effect of Rolling and Annealing Procedures on the Structure and Grain-size of Aluminium-copper-magnesium Alloy Strip"; (2) E. F. Emley: "Non-metallic Inclusions in Magnesium-base Alloys and the Flux-Refining Process"; (3) A. B. Middleton, L. B. Pfeil and E. C. Rhodes: "Pure Platinum, of High Re-crystallisation Temperature, Produced by Powder

(*Continued at foot of col.* 1.)

Moulder's Claim for Compensation

Judgment for Employers

At West Bromwich County Court, on August 10, Judge R. H. Norris delivered a reserved judgment in a case in which George Eden, a 64-year-old moulder, claimed compensation for a 100 per cent. disability, which he contended he had sustained by contracting silicosis at his employment, from Newby & Son (Ironfounders), Limited, West Bromwich. The case hinged on the question of whether a particular brand of parting sand which was used in the moulding of castings contained siliceous materials, as it was necessary for this to be proved for compensation to be payable.

In his judgment, Judge Norris said that the claim was brought under the Workmen's Compensation Acts for total disablement by silicosis, accompanied by tuberculosis. Since the age of 19 the applicant had been employed as an ironmoulder. He had worked in various foundries, but from 1935 until he ceased work in June, 1948, he had worked for the respondents, apart from a short break of a few weeks in 1939.

Dust in the Air

Describing his work as a moulder, Eden had said that parting powder was put into the mould and then damp sand was rammed round the pattern. The mould was in two parts and, when completed, they were put together. After the casting was made, the mould was then opened and the casting knocked out and, according to applicant, this operation caused dust to get into the air.

Eden ceased work in June, 1948, and on March 3, 1949, was examined by a medical board. Four days later, the board issued a certificate stating that he had been totally disabled from June 2, 1948, by silicosis accompanied by tuberculosis. A certificate having been obtained, his Honour continued, a claim for compensation was made on behalf of Eden, and was rejected on the grounds that he had not been employed in one of the processes included in the silicosis schemes of 1931 to 1946.

It was not every workman that suffered from silicosis as a result of his employment who was entitled to compensation. He must prove that he was a workman to whom the scheme applied, and must also prove that he was employed in one of the processes specified in the key. The onus of such proof rested with the applicant.

Eden alleged at the hearing that he was employed in a process described in the various Industries Silicosis Amendments Scheme of 1946. The process thus described was that of moulding of iron castings with the use of siliceous materials as a facing powder or parting powder. In his evidence applicant had said that he always used the same parting powder, and evidence had established to the satisfaction of the Judge that this sand came throughout from the same manufacturers, Derbyshire Stone, Limited.

This sand, continued the Judge, was delivered to the respondents in 1-cwt. bags, which were marked in red with the letters "N.S.C.," which were understood to mean "non-siliceous." The bags were emptied into a box close to the moulding shop and the moulders helped themselves from this box. After the rejection of the claim for arbitration in July last, a sample of the sand from this box was taken and submitted to an analyst, who had said that the sample showed 2.5 per cent. of total silicon content. But when asked to say whether there was any free silica in the sample, the analyst was unable to say. A member of the firm which made the parting sand had said that the company had been in business for about 30 years and the powder was made by grinding limestone, the total silicon by weight varying according to the seam, from a minimum percentage content of 0.83 to a maximum of 2.58. So far as he had been able to say, there was no free silica in the powder and it was sold as non-siliceous.

The company employed about 700 people, but although the works were dusty, they had never had a case of silicosis. Both this witness and the analyst had agreed that the type of sand actually used for the moulding process had a high content of free silica, about 80 per cent.

The Judge commented that silica was silicon dioxide, and if it was combined in a chemical combination with other elements, in his view it ceased to be silica. The main question in the case was whether that powder contained siliceous materials. The representative of the makers of the powder, when asked whether the powder contained siliceous material, had said "Yes," and if this was a question of fact, the Judge said that he thought that he would be bound by that. "But in my view," he said, "it is a question partly of fact and partly of law, and I think that the construction of siliceous materials is in this case a matter of law."

Judge's Conclusions

After carefully considering the matter, the Judge had come to the conclusion that a siliceous material was one which contained particles of silicon dioxide, no matter in what quantity. Under the terms of the Act, it was not necessary for the disease to be due to the particular process specified. If the powder contained siliceous material, it would be sufficient that, by reason of the employment, of which the process formed a part, a man was exposed to silica dust and contracted the disease.

"If this parting powder does contain siliceous materials," commented his Honour, "then I think that the applicant would be entitled to succeed, whether his disease is due to the use of the powder or the casting sand; but, as in my view this powder does not contain siliceous material, he has not brought himself within the scheme, and it seems to me that the application must fail."

Judge Norris added that he was quite satisfied that the disease was due to the man's employment, but due to the free silica in the moulding sand, some of which was unquestionably inhaled when the casting was knocked out of the mould. But the analysis had not shown that there was any free silica in the parting powder, and he was not in fact satisfied that such was the case. It was necessary to prove this before Eden could be covered by the scheme. He therefore gave judgment, with costs, to Newby & Son.

Engineering and Marine Exhibition

(*Continued from p.* 236.)

and heat-treatments are used for different purposes and this attention to service requirements is well demonstrated by the exhibits. Corrosion- and heat-resistant castings, both statically and centrifugally cast, are displayed, and parts made by powder metallurgy—filters, oil-retaining bearings, bushes and small pistons—complete the range.

Technically Controlled Castings Group (Grand Hall, ground floor, row J, stand 14).—As would be expected, there are on this stand numerous high-quality castings displayed, in grey and alloy iron, carbon and alloy steel, white- and black-heart malleable and non-ferrous alloys, all being made by one or other of the six foundries belonging to this group. What, however, is obvious only to the experienced foundryman, is the vast amount of scientific knowledge which has gone into the production of each of the castings shown. Such propaganda as is physically presented on this stand does much to enhance the reputation of the whole industry.

Wolf Electric Tools, Limited (National Hall, ground floor, row P, stand 4).—Founders and pattern-makers interested in portable tools operated electrically will be particularly attracted by the wide variety both in capacity and applicability of the tools shown on this stand. Sanders, blowers, chisel mortisers, hammers, grinders and drills, as well as specialised engineers' tools, are well represented. Demonstrations of any of the tools shown are arranged for overseas visitors.

The Exhibition, which includes also a section devoted to welding interests, is to be open daily from 11 a.m. to 9 p.m. Admission is by ticket (price 2s. 6d. to the general public). Members of the Institute of British Foundrymen are invited guests of the organisers and a large party will visit Olympia to-morrow (August 26).

FIG. 6.—A MORGAN PLUNGER MIXER IN ACTION. (MORGAN CRUCIBLE COMPANY, LIMITED.)

News in Brief

MIRRLEES WATSON COMPANY, LIMITED, announces the appointment of Mr. J. R. Lamberton to the board of directors; Mr. J. M. Lauder has been made secretary of the company.

CANADIAN PIG-IRON PRODUCTION in May last is officially returned at 202,148 tons, against 193,305 tons in May, 1948. Production in the first five months of this year was 940,816 tons (847,930 tons).

A PLAQUE TO THE MEMORY of Charles Edward Crompton, late chairman of Cochran & Company, Annan, Limited, boilermakers, who, with Harry Llewellyn Davies, established the Newbie Works 51 years ago, was unveiled by Mrs. Crompton, widow of Charles E. Crompton, at a recent ceremony at Newbie Works.

BIRMINGHAM CENTRAL TECHNICAL COLLEGE, which pioneered the introduction of practical courses of study in the techniques of industrial management for workpeople's representatives, is to extend its work in this direction during the academic year 1949-50 by the introduction of a series of four-week courses for full-time trade union officials.

THE UNITED ENGINEERING & MINING FOUNDRY COMPANY, Pittsburgh, is reported to have received an order from the French company Société Lorraine de Laminage Continu for a new hot-strip mill. The order, it is stated, represents the largest single contract obtained by an American concern for rolling-mill machinery to be financed through the E.C.A. Delivery of the equipment is to be made within 20 months.

RUBERY OWEN & COMPANY, LIMITED, structural engineers, of Darlaston, is to launch a scheme for taking its old employees out of the factory into the more congenial atmosphere of a "rest" workshop. There will be no clocking on and off in the new shop and the men will work as long or as little as they please, their earnings varying accordingly. The workshop has yet to be built and equipped, but the company hopes to draft the first of its workers over 70 into it in the first full working week in September.

Mineral Wealth of the Colonies

Hopes for Increased Production

The report of the Metals and Minerals Panel of the Colonial Primary Products Committee, which has been studying the prospects of developing mineral production in the colonies, particularly with a view to increasing foreign exchange resources, says that it has been possible to make a few positive suggestions which may lead to increased production. It is also pointed out that the present scarcity of geologists is a limiting factor in assessing the mineral wealth of the colonial empire.

It is stated that in many colonial territories the mineral workings are already as fully developed as possible, while in others deposits are too small or too remote from transport, facilities or consuming centres to make their exploitation economic. The panel remarks that the range of the report is limited by the extent of present geological knowledge, and that completion of preliminary geological mapping of the colonies is handicapped by the scarcity of geologists. It is hoped to obtain some temporary assistance from the United States in this work. Among the detailed findings are:—

COPPER

Nearly 70 per cent. of the world's production of copper ore comes from North and South America. Colonial production is confined to Northern Rhodesia and Cyprus. United Kingdom annual requirements are now about 375,000 tons and may increase to 400,000 tons by 1954. United States consumption for the period 1950-52 is estimated at about 950,000 tons per annum. Domestic production for that period is estimated at 825,000 tons annually.

The present electrolytic refinery capacity in Northern Rhodesia is about 60,000 tons per annum. The bulk of the blister copper is sent to the U.K. for refining and the balance is refined in the U.S. Plant is now being erected to double the Northern Rhodesia output of electrolytically refined copper and it is hoped to obtain some of this equipment from the U.S.A. The companies' latest estimates of copper production for 1952-53 are 295,000 tons.

IRON ORE

European demand for rich iron ore has increased and supplies are likely to be scarce for some time. In addition, U.S. home supplies of rich ore from Lake Superior deposits are approaching exhaustion, and American demands for rich European ore may increase in the future. U.K. demand for imported ore at about 9,000,000 tons per year now considerably exceeds the average of that of the years immediately preceding the war and is running higher than the pre-war boom year of 1937 when over 7,000,000 tons were imported.

Sierra Leone production is expected to reach 950,000 tons by 1952-53. If certain expansion measures at Marampa are put into effect there is a possibility that output may reach 1,350,000 tons by 1952. Northern Rhodesian deposits are being investigated.

"We feel that there is a strong case for increasing production from existing Sierra Leone deposits and for developing the new deposits there as quickly as possible. There is not the same case for working other new deposits in the colonial empire which are not of comparable quality. The position should, however, be reviewed from time to time in the light of further information about future European requirements."

LEAD

Development work in lead mines was seriously neglected during the war, and this is one of the major reasons for the inability of the mines to meet post-war requirements adequately. Owing also to the delay in rehabilitating the industries of such important producers as Burma, Yugoslavia, and other European countries, world production of primary lead is still considerably short of pre-war figures. "It seems unlikely that production will catch up with demand for some time; the outlook for lead producers is therefore considered to be good. Information regarding the price which the U.K. Government is prepared to pay for lead has been sent to the colonial governments concerned."

The panel recommended that information regarding the United Kingdom supply difficulties and the price which the Ministry of Supply is prepared to pay for lead should be sent to the colonial governments concerned with a view to an increase in existing production and to a review of the position of deposits hitherto considered uneconomic. This action has been taken.

ZINC

Northern Rhodesia is at present the only colonial producer, but ore-bodies at Abakaliki and Zurak in Nigeria are lead-zinc ores, and when mining begins both minerals will probably be produced. There are no other colonial possibilities known at present. In Northern Rhodesia zinc is mined with lead and vanadium ores, and lead and zinc production is expected to increase relatively to vanadium. Zinc production has, in fact, steadily increased from 10,000 tons in 1938 to over 21,000 tons in 1947. Owing to limitations of refinery capacity and electricity supply, future production is not expected to exceed this figure.

CHROME ORE

Colonial production is confined to Sierra Leone (16,500 tons in 1947) and Cyprus (7,418 tons in 1947). There is a large and continuing demand, and the steady upward trend of world consumption shows no signs of ending. Installation of a concentration plant now planned by the company operating in Sierra Leone should increase the quantity of the local ore which is marketable.

There are two companies mining in Cyprus, but only one produces substantial amounts. This company estimates its annual output at 10,000 tons of ore which

Mineral Wealth of the Colonies

gives an estimated marketable yield of 4,000 tons of lump ore and 3,000 tons of concentrates.

There are considerable deposits of ore at Kilembe in the Western Province of Uganda. A Canadian company is prospecting to find whether sufficient reserves exist to make exploitation an economic proposition. A pilot plant will be installed, but it will not be working until 1950 at the earliest. In Tanganyika copper ore is known to occur in association with lead, gold and silver ores in the Mpanda area, but production has not yet commenced. Prospecting operations now being carried out in other areas may yield important results.

MANGANESE ORE

Gold Coast is the chief colonial producer and it has become the world's leading exporting country. But mining has also taken place in Malaya and Northern Rhodesia. U.K. demand in 1949 is estimated at 450,000 tons.

Conference on Foundry Sands

Provisional Programme

The British Cast Iron Research Association is organising a conference on foundry sands, to be held at Ashorne Hill, Leamington Spa, from September 29 to October 1.

The programme, which we reproduce below, is tentative and it is probable that it will receive certain changes and modifications to suit the requirements of individual lecturers. The final programme will be printed and circulated at Ashorne Hill.

Thursday afternoon, September 29.

(1) Opening address by Dr. J. G. Pearce, Director, British Cast Iron Research Association; (2) "Composition and Properties of Sands," by Mr. W. B. Parkes, B.C.I.R.A., and (3) "Core Binders," by Mr. R. G. Godding, B.C.I.R.A.

Friday, September 30.

(4) "Sand Testing and its Application in the Foundry," by Mr. W. B. Parkes; (5) "Synthetic Resins as Core Binders," by Mr. J. J. Sheehan, B.Sc., Coneygre Foundry, Limited, Tipton; (6) "Di-electric Heating of Moulds and Cores," by Mr. R. G. Godding; (7) "Mechanisation and its Effect on Sand and Sand Control" (lecturer to be announced later); (8) "Effect of Pitch and Coal Dust on the Properties of Moulding Sands," by Mr. D. A. Taylor, B.C.I.R.A., and (9) "Natural and Synthetic Sands," by Mr. W. B. Parkes.

Saturday, October 1.

(10) "Influence of Foundry Sand on Scab Formation in Castings," by Mr. D. A. Taylor."

There will be a cinema performance at 8 p.m. on September 29 and 30, with a change of programme on the second evening.

Readers wishing to participate in the conference should write to Mr. G. R. Woodward, B.C.I.R.A., Alvechurch, near Birmingham.

Company Results

(Figures for previous year in brackets.)

A. & J. MAIN & COMPANY—Dividend of 12½% (same).

JOHN C. PARKES & SONS—Interim dividend of 5% (3½%).

ENGINEERING COMPONENTS—Interim dividend of 10% (same).

HERBERT TERRY & SONS—Interim dividend of 10% (same).

H. & J. HILL (WILLENHALL)—Interim dividend of 15% (same).

WILLENHALL MOTOR RADIATOR COMPANY—Interim dividend of 15% (same).

GEORGE COHEN, SONS & COMPANY—Final dividend of 12%, making 20% (same).

GEORGE KENT—Final dividend of 7% (6%) on larger capital, making 10% (same).

NICO LIGHT ENGINEERING COMPANY—Dividend of 10% and bonus of 5% (same).

PEERLESS & ERICSSON—Final dividend of 20% and bonus of 10%, making 50% (30% in one payment).

RIPPINGILLES—Trading profit to March 31, £38,242 (£23,424); other income, £961 (£36); to depreciation, £3,552 (£2,280); directors, remuneration, £4,700 (£4,675); tax, £15,390 (£9,296); leaving £15,561 (£7,209); to general reserve, £7,500 (£2,500); additional profits tax, 1947, nil (£300); dividend of 7½% (same); forward, £8,629 (£4,693).

GJERS, MILLS & COMPANY—Trading profit for 1948, after charging administration expenses and providing £10,174 for relining, £64,983 (£52,634); to bank interest, nil (£540); interest paid under guarantee, £300 (same); directors' fees, £1,300 (£1,228); income tax, £26,580 (£15,185); profits tax, £10,175 (£7,415); holidays with pay, nil (£1,000); depreciation, £6,000 (same); provision for renewals, £8,700 (£9,000); dividend of 8% (same); forward, £41,810 (£41,762).

JAMES HOWDEN & COMPANY—Consolidated profit to April 30, £316,591 (£296,857); fees, £26 (£39); to debenture interest, £3,303 (£3,516); depreciation, £31,263 (£31,477); directors' fees, £3,200 (£1,733); leaving £278,851 (£260,170); parent company's balance, £278,822 (£260,145); to profits tax, £40,340 (£40,000); income tax, £102,518 (£96,000); deferred repairs, nil (£7,000); general reserve, £65,000 (£60,000); off goodwill, £15,000 (£10,000); off patents, £5,000 (£693); final dividend of 22½%, making 30% (same); forward, £42,780 (£36,861).

WOLVERHAMPTON METAL COMPANY—Consolidated accounts to March 31 show balance from trading accounts, £275,127 (£274,750); other income, £878 (£732); to depreciation, £9,882 (£7,037); directors' emoluments, £7,539 (£6,287); audit, £563 (£525); profits tax, £35,000 (£35,500); leaving £223,021 (£226,133); to income tax, £100,000 (£105,000); off goodwill, nil (£3,472); employees' past service pensions, nil (£20,000); reserve against fall in metal prices, nil (£20,000); dividend equalisation reserve, nil (£10,000); general reserve, £50,000 (£11,399); employees' service fund, £2,000 (nil); dividend of 40% (same); forward, Wolverhampton Metal, £102,444 (£65,445), James Bridge Copper Works,, nil (same).

Contracts Open

The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained. Details of tenders with the reference E.P.D. or C.R.E. can be obtained from the Commercial Relations and Exports Department, Board of Trade, Thames House North, Millbank, London, S.W.1.

LIMAVADY, September 3—Supply of spun-iron water pipes and valves, for the Rural District Council. Munce & Kennedy, consulting engineers, 24, Arthur Street, Belfast. (Deposit, £3 3s.)

DEPWADE, September 5—Supply, laying, etc., of about 3½ miles of 3-in. to 7-in. cast-iron pipe mains, for the Rural District Council. A. P. I. Cotterell & Son, engineers, 54, Victoria Street, Westminster, London, S.W.1. (Deposit, £2 2s.)

TRURO, September 6—Supply and laying of cast-iron water mains, etc., for the Rural District Council. Mr. G. Osmand, engineer, "The Old Filter House," Trenance Gardens, Newquay, Cornwall. (Deposit, £2 2s.)

Solving Our Economic Difficulties

F.B.I. on Threat of Further Austerity and Unemployment

Such schemes as the nationalisation of iron and steel are irrelevant to our present crisis, distracting to those who should be concentrating on production and marketing problems, and damaging to our future prospects, according to the Federation of British Industries in a statement in which it expresses its concern at the inadequate appreciation of our economic situation. There is grave danger of being unable to obtain the food and raw materials that we need and we shall soon have to face further austerity and unemployment, unless some solution to our difficulties is found. The statement continues by saying:—

We are, in fact, confronted with two interlocking problems. In the first place we share with many other countries in a shortage of dollars to buy from America and Canada the goods which only they can immediately supply. Marshall aid has been designed to fill temporarily the gap between these imports and the European and other exports which directly and indirectly go to pay for them, and it was hoped that by 1952 we should be self-supporting.

It has become clear that the country's reserves are being spent far too rapidly. Great Britain is the banker for the whole sterling area, with the advantages and the responsibilities that this fact involves. Reserves are now reduced to 20 per cent. below the lowest margin of safety. Palliative stop-gap measures are being imposed by the various governments concerned, pending the conference at Washington in September. Nobody, however, suggests that these measures provide a permanent solution.

Britain's Dependence on Imports

The Federation says that Great Britain is particularly vulnerable as we have to import 60 per cent. of our food and a great deal of our raw material. We are therefore faced with the second problem—that of paying our way (with temporary help in dollar markets) in our international trading with all other countries (including dollar countries). In 1948 we achieved this balance, but only under abnormally favourable conditions. It is doubtful if we are doing so to-day. Moreover, a large part of the credit side of the balance consisted of exports made in payment of wartime debts and, therefore, not available to buy the imports we currently needed. To that extent the balance was unreal. The payment for current imports must come from yet more exports sold under normal competitive conditions. Irrespective of the dollar gap we must put ourselves in a sound trading position with the rest of the world. It is our visible exports from productive industry, together with the invisible exports arising from the whole machinery of trade, including the services rendered by shipping, industry, banking, and insurance, that must pay for the imports of food and raw materials; and there can be no escape from the hard logic that our standards of living, including social services, must be cut according to the cloth we can from now on make.

The vast and menacing increase in State expenditure constitutes the basic inflationary influence in our whole economy. It is this which bears most heavily upon production costs and is one of the most serious handicaps to the future of British trade and to the living standards and employment of our people. Now that we have passed from the seller's market of recent years, the dangers of living beyond our means, with its corollary of high and crippling taxation, will be felt.

Re-establishment an International Affair

The re-establishment of Western civilisation must come from the co-operation of many nations on both sides of the Atlantic. Great Britain as a world power has a special responsibility to play its part. Unless she earns it, she has no right to expect a higher standard of living than her neighbours. Unless she earns it, too, she will not long maintain the standard that she now enjoys. This is emphasised by the evidence that is now accumulating that in fact she is believed by other countries to be attempting to achieve too quickly what she can no longer afford. The savings of past generations have been spent in the war. Future prosperity depends on present effort.

The Federation concludes by saying:—

One thing is obvious. We must as a nation pay our way. This depends on productive industry, supported by the trading and other services that earn our invisible exports. There is therefore the plainest necessity to give every encouragement to it. In the competitive conditions that are increasingly to be expected it is essential that every help be given in reducing costs of our exports; value for money alone will enable us to sell in overseas markets. This means that taxation, and therefore Government expenditure, must come down. At present the taxgatherer collects 8s. out of every £ that the nation produces. Profits are taxed even more heavily than this, and no opportunity is left to create adequate reserves. It is little wonder if companies—or individuals—feel little inducement to take the risks which the situation demands. The high taxation which we now bear is itself a direct cause of high costs.

It means, too, that the rigidity of the planning of our economic life should be relaxed. Controls have undoubtedly been reduced in number, but more could be abandoned. Price mechanism will, as it has in the past, apply the necessary correctives. The spur of competition is still the most effective aid to efficiency. It means, too, that we must face the fact that as a nation we must work harder without increasing costs of production. Finally, we must concentrate on the things that matter, everyone engaged in industry must strain every nerve to cheapen methods of production, to abandon restrictive practices, and to adopt all possible aids to increased productivity.

New Companies

("Limited" is understood. Figures indicate capital. Names are of directors unless otherwise stated. Information compiled by Jordan & Sons, 116, Chancery Lane, London, W.C.2.)

BERRYS FOUNDRY (1949), New Bank, Halifax—£4,500. T. C. Wilson, O. and H. Berry.

ELWELLS ENGINEERS, Wolverhampton New Road, Tipton, Staffs—£10,000. W. and M. Elwell.

CALUDON ENGINEERING COMPANY, Hall Lane, Walsgrave, Coventry—£5,000. D. W. Yates and D. Sidwell.

C. BINKS—Brass and iron founders. £5 000. C. Binks, 10, Draycott Road, Wanstead, London, E.11, and A. J. Binks.

METALOCK (BRITAIN)—Engineers, founders, etc. £35,000. E. C. Peckham, 23D, Kensington Court, London, W.8.

PIPEWELD, Park Road, Timperley, Ches—Welders and engineers. £10,000. G. B., K. M. and R. Jones, and J. Williams.

THETFORD ENGINEERING COMPANY, West Hill House, Horringer Road, Bury St. Edmunds—£5,000. C. and P. Grange.

V. E. HIPPERSON, 1, Pitt Street, Norwich—Mechanical engineers, etc. £3,000. G. V., A. E. and E. J. Hipperson and A. E. Bone.

REYNOLDS METAL ENTERPRISES, Old Leeds Steelworks, Midland Road, Balm Road, Leeds—£5,000. H. L. and A. Reynolds.

ROBERT HIPKISS, Vicarage Road, Blackheath, Worcs—Engineers and tube fitting manufacturers. £5,000. R. Hipkiss and B. Westwood.

TALBOT-PONSONBY & COMPANY, Langrish House, Langrish, Petersfield—Precision engineers, etc. £12,500. E. F. and M. L. Talbot-Ponsonby.

E. M. SMITH & COMPANY, The Mount, Chester Road, Grappenhall, Ches—Machinery merchants and engineers. £10,000. E. M. and S. Smith.

MARTIN & PARNELL—Engineers' supplies. £7,500. T. D. Martin, 164, Maldon Road, Colchester, and R. M. and L. I. Martin and F. C. Dines.

J. W. THOMPSON (IRONFOUNDERS)—£10,000. R. M. Lindsley, 9, Valebrook, Tunstall Road, Sanderland, and F. M. Greig, T. S. Turnbull and H. A. Burnett.

TRIPP BATT & COMPANY, Stanton, Suffolk—To acquire the agricultural engineering branch of Sturgeon Bros. £20,000. F. P. Bridge, F. G. Tripp and P. D. Batt.

ROBERT SMITH & SONS, 17-21, Cathcart Street, Birkenhead—Iron and steel merchants. £18,000. S. J., R. A. C., S. and R. L. Smith and P. A. Oulton-Bales.

DAVRO IRON & STEEL COMPANY, Office of J. Dudley (Lye), Limited, Star Street, Lye, Worcs—£2,000. L. W. Davenport, J. W. R. Roo and R. Bloomer.

Gazette

RADCO INDUSTRIES (ENGINEERING), LIMITED, is being wound up voluntarily. Mr. E. R. S. Martin, 43, Westgate Chambers, Newport, Mon, is the liquidator.

MR. A. J. BLOCH, 3-4, Clement's Inn, Strand, London, W.C.2, has been appointed liquidator (with a committee of inspection) of Nash Engineers (Staines), Limited.

BETTS ENGINEERING COMPANY, LIMITED, is being wound up voluntarily. Mr. E. Clark, High Holborn House, 52-54, High Holborn, London, W.C.1, is the liquidator.

SANDERS PRECISION ENGINEERING COMPANY, LIMITED, is being wound up voluntarily. Major W. Hartley, Langley Cottage, Fulmer, Bucks, and Mr. H. F. Sanders, The Glen, Broad Lane, Bracknell, Berks, are the joint liquidators.

LETTERS HAVE BEEN DESPATCHED from the National Foundry Craft Training Centre to all branch-presidents and secretaries of the Institute of British Foundrymen inviting them to visit Swan Village, in order that they can popularise its work in the various districts.

New Patents

The following list of Patent Specifications accepted has been taken from the "Official Journal (Patents)." Printed copies of the full Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 1s. each. The numbers given are those under which the Specifications will be printed, and all subsequent proceedings will be taken.

609,240 LOUVROIL-MONTBARD-AULNOYE. Method of electrically-heating metal parts.

609,278 WESTINGHOUSE ELECTRIC INTERNATIONAL COMPANY. Refractory metal tubes.

609,377 INTERNATIONAL SMELTING & REFINING COMPANY. Producing boron-copper alloys.

609,505 UNITED STATES VANADIUM CORPORATION. Molybdenum and tungsten compounds.

609,521 CHISHOLM, J. Method of joining metal sheet or strip.

609,582 FORD MOTOR COMPANY, LIMITED. Shot peening of metallic articles.

617,057 CALLITE TUNGSTEN CORPORATION. High-density alloy.

617,116 PHILIPS LAMPS, LIMITED. Cast-iron welding.

617,128 SHEEPBRIDGE STOKES CENTRIFUGAL CASTING COMPANY, LIMITED, and STOKES, J. E. Manufacture of centrifugally cast plural-metal articles.

617,144 MOND NICKEL COMPANY, LIMITED. Production of cast iron.

617,161 MEAD, W. H. Method and apparatus for sand blasting.

617,178 BATES, R. E., and BRIDGE, A. C. Gravity die casting of light metal frames.

617,194 HAYNES STELLITE COMPANY. Alloys for high-temperature use.

617,195 HAYNES STELLITE COMPANY. Alloys for high-temperature service.

617,212 BRITISH THOMSON-HOUSTON COMPANY, LIMITED. Hard metal alloys.

617,317 ELECTRO METALLURGICAL COMPANY. Addition agent for treating molten ferrous metal.

617,318 ELECTRO METALLURGICAL COMPANY. Alloy addition agent and method of incorporating alloying elements into molten ferrous metal.

617,325 MOND NICKEL COMPANY, LIMITED. Alloy steels.

617,336 STANDARD TELEPHONES & CABLES, LIMITED, NEWTON, G., and NIGHTINGALE, E. L. Die castings.

617,350 INDIAN STANDARD METAL COMPANY, LIMITED, and SCHWARTZ, A. Process of and apparatus for separation of one or more metals from alloys.

617,499 RUSCOE, E. B., and TURNER, J. J. Continuous casting machines.

617,689 MOND NICKEL COMPANY, LIMITED. Electrodeposition of nickel on nickel.

617,804 GLACIER METAL COMPANY, LIMITED, TAIT, W. H., and BROWN, W. B. D. Moulds for casting metals or other molten substances.

617,819 GRESHAM, H. E., WHEELER, M. A., and HALL, D. W. Alloy for heat and corrosion resisting coating.

617,849 METAL-GAS COMPANY, LIMITED, and BOLTON, C. A. K. Manufacture of articles from ferrous metal powders.

617,896 GLOBUS, A. R. Process of recovering tungsten from tungsten carbide.

617,961 HOLDEN, A. DE F. Rectifiers for chloride salt baths for heat treatment of ferrous articles.

617,975 MALECKI, G. Method of producing iron powder.

618,009 BROOKS, N. E. (Isthmian Metals, Incorporated). Heat treatment of duplex iron and steel bodies.

618,048 GENERAL ELECTRIC COMPANY, LIMITED, DOVEY, D. M., and WILLIAMS, S. V. Bright heat-treatment of ferrous metals.

618,082 MALLORY METALLURGICAL PRODUCTS, LIMITED. Resistance or spot welding electrodes.

618,120 COMPAGNIE DE PRODUITS CHIMIQUES ET ELECTROMETALLURGIQUES ALAIS, FROGES & CAMARGUE. Method for pickling, polishing and brightening metals and alloys.

618,202 HUMBER, LIMITED, and CLIFFORD, S. C. Anodizing of aluminium or aluminium base alloys.

618,293 BROOKES, N. E. (Isthmian Metals Incorporated). Making products of powdered iron or iron alloys.

618,386 MOND NICKEL COMPANY, LIMITED. Bearing alloys.

Raw Material Markets

Iron and Steel

The output of pig-iron during the past two months has been a little below normal. This, however, is entirely in accordance with past experience and has not occasioned serious inconvenience as requirements are also on a reduced scale during the holiday period. Whether the tempo of activity in the foundry trade can be fully sustained would appear to be doubtful. Many establishments are now rapidly overtaking their commitments, but if business does improve it should soon be possible to increase the supply of foundry iron. The output of hematite and low- and medium-phosphorus iron is fully absorbed and production of basic iron keeps pace with the current needs of the steel plants.

Temporarily, at least, the embarrassments of the re-rollers, arising from the earlier shortage of semi-finished steel, have been wholly overcome. Most of the mills are now reasonably well supplied with billets, sheet bars, slabs, etc. But this easier position is very largely due to the swollen imports arranged by the British Iron & Steel Corporation, Limited, and a stringent situation may speedily be recreated if the 25 per cent. import cut is applied to semi-finished steel. Substantial tonnages of Belgian small bars are in circulation, and these are still offered at keenly competitive prices.

Heavy rolling-mill capacity is fully engaged, and the present state of order-books suggests that these conditions will continue until the end of the year. Rollers of steel plates cannot indicate delivery dates earlier than about the middle of Period IV, and practically the whole of the potential output of light steel sheets is covered to the end of the year. Sectional material is obtainable at somewhat shorter notice, but railway equipment is eagerly sought both for home and export account, while tubemakers have commitments covering the whole of 1950.

Non-ferrous Metals

Last week's increase of £3 in the price of aluminium came as a surprise to the trade, for there had been no rise in the overseas value of the metal to account for it. Officially, the upward adjustment is attributed to the higher average cost of supplies which the Ministry has to pass on to the consumers. It has been suggested, however, that the authorities have made a change in the proportions of sterling and dollar aluminium purchases, and since the United Kingdom product costs more than the Canadian metal the average cost of acquisition rises. It is, of course, presumed that the adjustment has been in favour of a higher ratio of sterling aluminium. However, even at £93 per ton, aluminium is relatively cheap, especially in comparison with copper at £107 10s., although £93 is a good deal higher than £67, to which point the quotation was reduced in April, 1946. This low price was made possible by the favourable contract concluded with Canada for delivery during 1946/47; but when the Canadian dollar was revalued in July, 1946, a change in the sterling price became inevitable, and within two months the U.K. quotation went up to £72 15s. per ton. Since then, the trend of values has been steadily upwards until £90 was reached.

American copper statistics for July, published by the Copper Institute of New York, show that no improvement took place in the tonnage of deliveries to consumers. Since buying had been on a good scale this was somewhat unexpected. At 45,300 short tons the total is in fact lower than the 45,650 tons in June. Production of blister copper, which in May amounted to 81,250 short tons, fell to 71,600 tons in June, and to no more than 62,600 tons in July. This is, of course, due to cuts in mine output. Production of refined copper has also been falling, for the May figure was about 98,000 short tons, but June showed a reduction of 6,000 tons to 92,000 tons, while the July total was no better than 85,600 short tons. On the whole, the outlook in America seems to be more favourable than it was and there is less "recession talk" than was heard a few weeks ago. Prices, too, are firm, although zinc on the Commodity Exchange has appeared to show some weakness. In Britain the scrap market has been distinctly firm and relatively high prices have been paid. It is reasonable to suppose that in some directions fears of devaluation are gaining ground and some of the buying may be a "currency hedge."

Colvilles' Additional Plant

Over £4,000,000 is being spent on improving the Clyde Iron and Clydebridge Steelworks, Scotland's main sources of iron and steel, so vital to shipbuilding and all branches of engineering. Only a few miles from Glasgow there is the historic Clyde Ironworks, with the steel furnaces of Clydebridge Works on the opposite bank of the river, all part of the organisation of Colvilles, Limited.

In 1947 nearly 350,000 tons of iron were made; in 1948, with the addition of a third furnace, the total was 520,000 tons; in 1949, despite the fact that one of the furnaces has been out of action for re-lining, it is hoped to break the 1948 record. To keep pace with the consumption of the three furnaces in full production an additional 67 coke ovens are to be constructed, doubling the existing plant. There will be bunkers to hold 20,000 tons of coal, about the amount that will be turned into coke each week. Amongst other additional equipment that is under construction is a new water cooling tower to handle 750,000 galls. an hour. While much of the iron goes to other works, such as those at Glengarnock and Motherwell, about 2,500 tons each week cross the river by bridge—still molten—to the Clydebridge Steelworks.

Plans for further developments, particularly for the expansion of pig-iron production, have been prepared by Colvilles and submitted—with the support of the British Iron & Steel Federation—to the Ministry of Supply where they are now under consideration.

German Textile Machinery

Imports to be Increased

Progress is reported in the development of textile-machinery manufacture in the bizone of Germany. Before the war, this industry was largely situated in what is to-day the Russian zone, but numerous firms have started manufacture in the West since the end of the war. Output, recorded by weight, in the bizone rose from 362 metric tons in January, 1948, to 1,171 tons in December, 1948, and to 1,826 tons in March, 1949. During the latter month, 224 metric tons were also produced in the French zone.

However, the setbacks through war damage and the loss of capacity situated in the East of the country are too serious to be made good by the production efforts of the industry for a long time to come. Great efforts are therefore being made to obtain textile machinery from abroad. Switzerland is the main supplier and small consignments have been ordered from the United Kingdom, Belgium, France, Italy, and the United States. It is stated that textile machinery was imported during the first four months of this year to the value of $588,000. (It should be remembered that in Western Germany's foreign trade, prices are expressed in dollars; the above figure therefore does not refer to the U.S.A. only). Part of this was for orders placed in 1948 which could not be delivered owing to lack of foreign exchange. Orders placed so far are believed to be at least $3 million, and much more textile machinery than in 1948 is to be imported from Britain.

Although dollars are still scarce, German circles are optimistic about future imports of this kind of equipment.

Steel Output Cut by Holidays

Steel output in July was at an annual rate of 12,695,000 tons, compared with 12,084,000 tons in July, 1948. In each case production was interrupted by normal holidays. Output of steel in the seven months to date has exceeded the previous record levels reached last year in the same period by 431,000 tons.

Last month's pig-iron production was at an annual rate of 9,224,000 tons, against 8,908,000 tons in July, 1948.

Latest steel and pig-iron output figures (in tons) compare as follow with earlier returns:—

	Pig-iron.		Steel ingots and castings.	
	Weekly average.	Annual rate.	Weekly average.	Annual rate.
1949—1st quarter ..	179,300	9,324,000	304,800	15,850,000
2nd quarter ..	183,800	9,559,000	306,600	15,944,000
July	177,400	9,224,000	244,100	12,695,000
1948—1st quarter ..	174,700	9,084,000	287,200	14,933,000
2nd quarter ..	182,000	9,464,000	294,700	15,325,000
July	171,300	8,908,000	232,400	12,084,000

E.C.A. Aluminium Output

Imports Could be Lower

Further details have been made available of the report of the mission appointed by the Economic Co-operation Administration to study European aluminium requirements. The mission reported that, while it found no improprieties on the part of participating countries which had shipped secondary aluminium to the United States, at the same time as receiving E.C.A. aid in financing imports of virgin aluminium, almost every country could economise on imports by a more exhaustive use of secondary aluminium made from scrap. Action to use such material locally instead of exporting it for dollars would materially reduce the requirements for imports of primary metal, and thus reduce the drain on primary supplies and the need for use of E.C.A. dollars for this purpose.

Surplus of Primary Aluminium

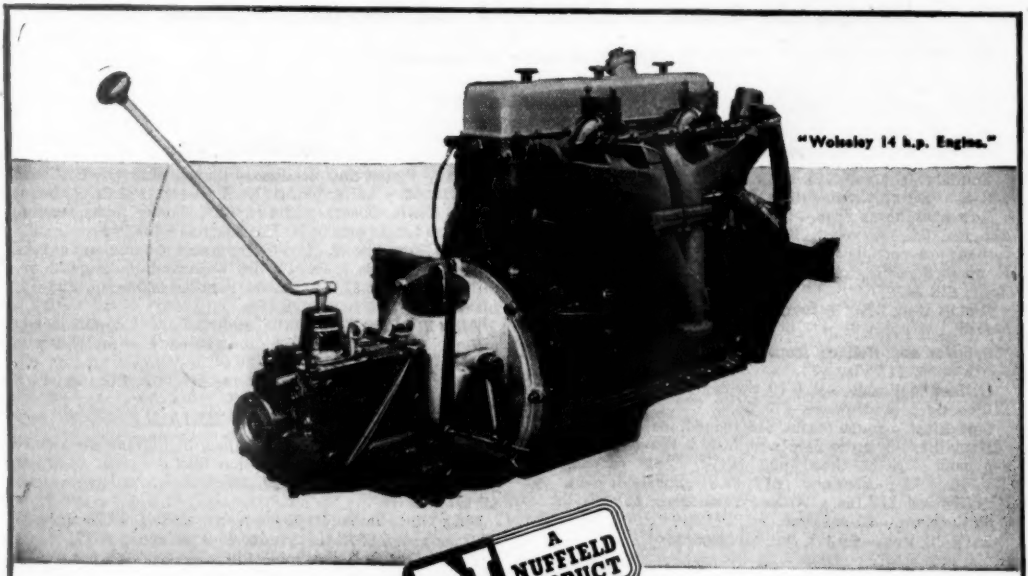
The report stated that, exclusive of the United Kingdom, Western Europe in 1949 should produce a surplus of primary aluminium above its essential requirements.

No evidence was found of the reshipment of any E.C.A.-financed aluminium to the United States or outside of the country to which the aid was given. There was, however, some evidence that certain countries, which had not received E.R.P. aid for aluminium, had shipped back to the United States some earlier purchases of metal bought originally in Canada. There was also considerable movement of secondary metal and scrap from the participating countries to the U.S. and to the Western Hemisphere at the same time that some of these countries were receiving E.R.P. aid for primary metal.

The mission said that the British aluminium industry was prompt in setting up a technical committee to review vigorously possible increased uses of secondary aluminium. This was highly desirable, but even stronger action was necessary to secure increased use of secondary metal in the making of wrought products in Britain.

Welsh Iron and Steel Output

Production of iron and steel in South Wales in the second quarter of this year amounted to 823,600 tons, equal to an annual rate of 3,294,000 tons. This compares with the 1948 quarterly peak annual rate of 3,191,000 tons set up in the second quarter. Output in the first quarter of 1949 was 821,500 tons, equal to an annual rate of 3,286,000 tons. These details have been issued by the Ministry of Supply, which adds that production of tinplate, terneplate and blackplate at 184,802 tons showed a slight falling off compared with the first quarter of the year, when output reached 195,400 tons. Even so, output for the second quarter of 1949 was just over 1,500 tons better than that for the corresponding period of last year.



A NUFFIELD PRODUCT

Using

STANTON-DALE

REFINED PIG IRON

USED AND RECOMMENDED
FOR ALL HIGH-DUTY
ENGINEERING CASTINGS

THE STANTON IRONWORKS COMPANY LIMITED, Nr. NOTTINGHAM

Current Prices of Iron, Steel and Non-ferrous Metals

(Delivered, unless otherwise stated)

August 24, 1949

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2:—Middlesbrough, £10 4s.; Birmingham, £10 0s. 6d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £11 15s. 6d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si)—North Zone, £12 2s. 6d.; South Zone, £12 5s.

Scotch Iron.—No. 3 foundry, £11 18s. 3d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £12 14s. 6d.; South Zone, £12 17s.

Refined Malleable.—P, 0.10 per cent. max.—North Zone, £13 4s. 6d.; South Zone, £13 7s.

Cold Blast.—South Staffs, £15 16s. 6d.

Hematite.—Si up to 2½ per cent., S & P over 0.03 to 0.05 per cent.; N.-E. Coast and N.-W. Coast of England, £11 16s. 6d.; Scotland, £12 3s.; Sheffield, £12 9s.; Birmingham, £12 15s.; Wales (Welsh iron), £11 16s. 6d.

Spiegeleisen.—20 per cent. Mn, £17 8s.

Basic Pig-iron.—£9 17s. 6d., all districts.

FERRO-ALLOYS

(Per ton unless otherwise stated, basis 2-ton lots, d/d Sheffield works.)

Ferro-silicon (6-ton lots).—20/30 per cent., £25 15s.; 40/55 per cent., £32 10s.; 70/85 per cent., £49.

Ferro-vanadium.—35/50 per cent., 15s. per lb. of V.

Ferro-molybdenum.—70/75 per cent., carbon-free, 6s. 5d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., carbon-free, 1s. 3½d. lb.

Ferro-tungsten.—80/85 per cent., 7s. lb.

Tungsten Metal Powder.—98/99 per cent., 8s. lb.

Ferro-chrome.—4/8 per cent. C, £60; max. 2 per cent. C, 1s. 5d. lb.; max. 1 per cent. C, 1s. 5½d. lb.; max. 0.15 per cent. C, 1s. 6½d. lb.

Cobalt.—98/99 per cent., 12s. lb.

Metallic Chromium.—96/98 per cent., 5s. 1d. lb.

Ferro-manganese (blast-furnace).—78 per cent., £25 3s.

Metallic Manganese.—94/96 per cent., carbon-free, 1s. 9d. lb

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms and Slabs.—BASIC: Soft, u.t., £16 16s. 6d.; tested, up to 0.25 per cent. C (100-ton lots), £17 1s. 6d.; hard (0.42 to 0.60 per cent. C), £18 16s. 6d.; silico-manganese, £23 19s.; free-cutting, £20 1s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £22 4s.; case-hardening, £23 1s. 6d.; silico-manganese, £26 6s. 6d.

Billets, Blooms and Slabs for Forging and Stamping.—Basic, soft, up to 0.25 per cent. C, £19 16s. 6d.; basic, hard, over 0.41 up to 0.60 per cent. C, £21 1s. 6d.; acid up to 0.25 per cent. C, £23 1s. 6d.

Sheet and Tinplate Bars.—£16 16s. 6d.

FINISHED STEEL

Heavy Plates and Sections.—Plates, ship (N.-E. Coast), £20 14s. 6d.; boiler plates (N.-E. Coast), £22 2s.; chequer plates (N.-E. Coast), £22 19s. 6d.; heavy joists, sections and bars (angle basis), N.-E. Coast, £19 13s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., untested, £22 6s.; flats, 5 in. wide and under, £22 6s.; rails, heavy, f.o.t., £19 2s. 6d.; hoop and strip, £23 1s.; black sheets, 17/20 g., £28 16s.

Alloy Steel Bars.—1-in. dia. and up: Nickel, £35 6s. 6d.; nickel-chrome, £49 18s. 6d.: nickel-chrome-molybdenum, £55 0s. 9d.

Tinplates.—I.C. cokes, 20 × 14, per box, 41s. 6d., f.o.t., makers' works.

NON-FERROUS METALS

Copper.—Electrolytic, £107 10s.; high-grade fire-refined, £107; fire-refined of not less than 99.7 per cent., £106 10s.; ditto, 99.2 per cent., £106; black hot-rolled wire rods, £116.

Tin.—99 to under 99.75 per cent., £569; 99.75 to under 99.9 per cent., £572 10s.; min. 99.9 per cent., £577.

Zinc.—G.O.B. (foreign) (duty paid), £63 10s.; ditto (domestic), £63 10s.; "Prime Western," £63 10s.; electrolytic, £64 5s.; not less than 99.99 per cent., £65 15s.

Lead.—Good soft pig-lead (foreign) (duty paid), £87 5s.; ditto (Empire & domestic), £87 5s.; "English," £88 15s.

Zinc Sheets, etc.—Sheets, 10g. and thicker, ex works, £77 10s.; rolled zinc (boiler plates), ex works, £75 10s.; zinc oxide (Red Seal), d/d buyers' premises, £63 10s.

Other Metals.—Aluminium, ingots, £93; antimony, English, 99 per cent., £160; quicksilver, ex warehouse, £18 10s.; nickel, £224.

Brass.—Solid-drawn tubes, 19½d. per lb.; rods, drawn, 10½d.; sheets to 10 w.g., 16d.; wire, 16½d.; rolled metal, 14½d.

Copper Tubes, etc.—Solid-drawn tubes, 19½d. per lb.; wire, 144s. 9d. per cwt. basis; 20 s.w.g., — per cwt.

Gunmetal.—Ingots to L.G.2 (85/5/5/5), £76 to £90; L.G.3 (86/7/5/2), £80 to £118; G1 (88/10/2), £125 to £156 per ton, delivered.

Phosphor-bronze Ingots.—P.Bl, £126 to £170; L.P.Bl, £88 to £118 per ton.

Phosphor Bronze.—Strip, 22½d. per lb.; sheets to 10 w.g., 24½d.; wire, 24½d.; rods, 23d.; tubes, 27½d.; chill cast bars: solids, 23d., cored, 24d.; 10 per cent. phos. cop., —; 15 per cent. phos. cop., —; phosphor tin (5 per cent.), —. (C. CLIFFORD & SON, LIMITED.)

Nickel Silver, etc.—Ingots for raising, 1s. 4½d. per lb. (7%) to 2s. 1d. (30%); rolled metal, 3 in. to 9 in. wide, × .056, 1s. 10½d. (7%) to 2s. 7d. (30%); to 12 in. wide, × .056, 1s. 11d. to 2s. 7½d.; to 25 in. wide, × .056, 2s. 1d. to 2s. 9½d. Spoon and fork metal, unsheared, 1s. 9½d. to 2s. 5½d. Wire, 10g., in coil, 2s. 3½d. (10%) to 3s. 0½d. (30%). Special quality turning rod, 10%, 2s. 2½d.; 15%, 2s. 7d.; 18%, 2s. 11d.

Awards to Pluto Engineers

Tax-free awards, totalling £15,100, which have been made by the Royal Commission on Awards to Inventors to four men whose inventions made the Pluto (cross-Channel pipe-line) scheme possible, include £850 to Mr. M. K. Purvis, resident ship overseer of Cammell Laird & Company, Limited, Birkenhead, and £250 to Mr. A. E. Price, of Kenton, Middx, who at the time of the project was with the Ministry of Fuel and Power. Mr. Purvis was largely concerned with the design and development of the drum around which the steel pipe-line was wound, while Mr. Price contributed the wedge gripping device which enabled the pipeline to be fixed near the shore and marked in position.

The other two recipients are Mr. A. C. Hartley (£9,000), who at the time was chief engineer of the Anglo-Iranian Oil Company, Limited, and who conceived the idea of a pipeline in the form of hollow cable laid by a cable ship, and Mr. B. J. Ellis (£5,000), who was credited with the idea of winding the pipe in welded sections on a big drum which could float or be towed or fitted into a hopper-type ship. The Commission recommended no award to Resistance Welders, Limited.

AN OUTBREAK OF FIRE last Thursday caused damage in the paint-spraying department of J. H. Heaton, Limited, washing-machine makers, Globe Iron Works, Keighley. Arrangements have been made to carry on business as usual.

Increases of Capital

Details of increased capital have been announced by the following companies:—

D.B.H. (ENGINEERS), LIMITED, London, W.14, increased by £900, in £1 shares, beyond the registered capital of £100.

FRAYS (ENGINEERS), LIMITED, Biddulph, Stoke-on-Trent, increased by £5,000, in £1 shares, beyond the registered capital of £10,000.

MARKLAND ENGINEERING COMPANY, LIMITED, Worksop, increased by £1,000, in £1 shares, beyond the registered capital of £500.

CONGREVE ENGINEERING COMPANY, LIMITED, Oswestry, increased by £2,000, in £1 shares, beyond the registered capital of £2,000.

SNOW DEAKIN & COMPANY, LIMITED, engineers, etc., of Barnstaple, increased by £3,000, in £1 shares, beyond the registered capital of £5,000.

STARTRITE ENGINEERING COMPANY, LIMITED, Chatham, increased by £2,000, in £1 shares, beyond the registered capital of £5,000.

WILLIAM HERBERT, LIMITED, shipbuilders, engineers, etc., of Liverpool, increased by £49,500, in £1 shares, beyond the registered capital of £500.

HUNT & COMPANY (BOURNEMOUTH), LIMITED, engineers, etc., increased by £2,000, in £1 ordinary shares, beyond the registered capital of £9,000.

HALL SECTIONS, LIMITED, engineers, ironfounders, etc., of North Shields, increased by £4,500, in £1 ordinary shares, beyond the registered capital of £500.

GEORGE LANGLEY, LIMITED, manufacturers of engines, etc., of Bedford, increased by £5,000, in £1 "A" shares, beyond the registered capital of £30,000.

F. L. SMIDTH & COMPANY, LIMITED, engineers, etc., of London, W.1, increased by £500, in 1s. ordinary shares, beyond the registered capital of £100,000.

LOW PHOSPHORUS
REFINED & CYLINDER
HIGH DUTY
MALLEABLE
DERBYSHIRE
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PIG-IRON

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LONDON, E.C.2.
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London Wall 4774 (6 Lines)

FERRO-SILICON
FERRO-ALLOYS
BRIQUETTES
ALL NON-FERROUS
METALS & ALLOYS
MOULDING SAND

And at—

BIRMINGHAM, 2, 39, Corporation St. Midland 3375/6
LIVERPOOL, 2. 13, Rumford St. Central 1558
GLASGOW, C.2. 99, Hope Street, Central 9069

NOTICE

Small Advertisements in this section of the Journal are accepted at the *prepaid* rate of 20 words for 5/- (minimum charge) and 2d. per word thereafter. Box number advertisements 2/- extra. Instructions together with remittance must be received not later than first post on Friday for inclusion in Thursday's issue addressed to the Advertisement Manager, Foundry Trade Journal, 49 Wellington St., London, W.C.2.

Situations advertised under this heading are available only to applicants excepted from the Control of Engagement Order, 1947, No. 2021.

Replies to Box Numbers to be addressed to:— "Foundry Trade Journal," 49, Wellington Street, London, W.C.2.

SITUATIONS WANTED

FOREMAN PATTERNMAKER with wide experience in the manufacture of Soil and Rainwater Goods, Stove Grate, and General Engineering Castings, desires progressive position as Assistant Manager or Manager, with established concern.—Box 262, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER wants change; 30 years' mechanised moulding experience, modern production methods; has also advised most large companies on modern mechanisation; very high position now held; would consider abroad if needed. Box 250, FOUNDRY TRADE JOURNAL.

PATTERNMAKER, Rate Fixer and Planner seeks position with Engineers; experience general patternmaking, foundry mechanisation; at liberty about the middle of November, after completing work abroad.—Box 218, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

EXCELLENT opportunity energetic practical FOUNDRYMAN, preferably already calling trade, sell new proposition interesting all foundries.—Box 962, FOUNDRY TRADE JOURNAL.

FOUNDRY FOREMAN (Non-Ferrous) required for London Foundry. Must be fully experienced in high class engineering work. Strict disciplinarian. Knowledge of alloys to specification essential.—Write, stating age, technical qualifications, references (copies only), full details of experience and salary required, to Box 248, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*Contd.*

AN old-established Firm of Non-ferrous Founders in the Croydon area, specialising in jobbing and repetition work, have a number of vacancies for Skilled MOULDERS.—Application, stating age and experience, to Box 966, FOUNDRY TRADE JOURNAL. This advertisement appears by permission of the Ministry of Labour and National Service under the Control of Engagement Order, 1947.

AN EXPERIENCED FOUNDRY SUPERINTENDENT is required by a company located 30 miles South of London, to take charge of Iron Foundry producing precision machine moulded castings of high quality; capacity 10 tons per week; commercial and aircraft aluminium castings, capacity 10 tons per week; die castings, gravity and pressure, capacity 15 tons per week; and some bronze, gunmetals and magnesium castings; and a well-equipped Pattern Shop serving these Departments. The successful candidate must be capable of controlling the estimating and ratefixing of the Departments and obtaining the maximum high quality production. The position offers considerable interest and scope for a man with the necessary experience, energy and initiative; it will be permanent and progressive, and remuneration will include a fixed per annum salary plus a percentage on the gross profits of the Departments. Applicants should give full details of age, experience, positions held, and state in confidence where at present employed, salary required, and when at liberty.—Apply Box 260, FOUNDRY TRADE JOURNAL.

APPLICATIONS are invited for an Executive Appointment in the Commercial Department of a large and important group of non-ferrous foundries in the London area. The man appointed will be responsible to the General Manager for the administration of this Department. Applicants should possess a sound knowledge of modern indoor sales administration, and be experienced in the preparation of quotations and General Correspondence with customers. The position offers good prospects to the right man, and is pensionable.—Write, giving details of age, qualifications, salary required, and experience, in chronological order, to Box 246, FOUNDRY TRADE JOURNAL.

CORESHOP FOREMAN required for light alloy foundry in Birmingham area. Must be conversant with up-to-date methods, including core-blowing, and capable of handling mixed labour. Able to fix prices and read blueprints.—Reply, stating age, experience, and salary required, Box 232, FOUNDRY TRADE JOURNAL.

METALLURGIST with experience of Grey and Malleable Irons, required for a Midland Foundry. This is an opportunity for a young man with initiative to join a progressive firm.—State age, experience and salary, to Box 256, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*Contd.*

APPLICATIONS are invited for appointment to an unestablished post of CHEMIST-IN-CHARGE at a Ministry of Supply Factory in Co. Durham.

Candidates should have an honours degree in Chemistry, Metallurgy, Physics, or Engineering, or Associateship of the Royal Institute of Chemistry, the Institution of Metallurgists, or the Institute of Physics, and experience in a factory or industrial laboratory; or corporate membership of the Institution of Chemical Engineers. They should have had experience or knowledge of the manufacture and hot and cold rolling of 70/30 brass and preparation of solid drawn components therefrom; the heat treatment of special steels used for making draw tools, dies and punches—for cold and hot draw press work; some knowledge of hot draw press work in steel, and able to initiate investigations into behaviour and use of aluminium alloys.

The successful candidate will be required to take charge of the chemical, metallurgical and testing laboratories at the factory.

The salary for the post will be assessed according to qualifications and experience within the range £720—£960 per annum inclusive.

Candidature will normally be confined to natural born British subjects born within the United Kingdom, or in one of the self-governing Dominions, of parents similarly born.

Write, quoting F.578/49A, to MINISTRY OF LABOUR AND NATIONAL SERVICE, Technical and Scientific Register, K, York House, Kingsway, London, W.C.2, for application form, which should be returned by 30th September, 1949.

FIRM in the Midlands building new Foundry invite applications for the post of FOUNDRY MANAGER. Applicants should have knowledge of modern foundry layout and metallurgy with first class experience of the production of high quality castings in magnesium and other non-ferrous metals.—Applications, stating experience, age, and salary required, to Box 230, FOUNDRY TRADE JOURNAL.

PRACTICAL ASSISTANT FOUNDRY FOREMAN, young man with experience in producing high grade H.F. steel castings an advantage, but considered more important perseverance and aptitude getting best from workers. Small expanding firm, friendly atmosphere.—Apply writing only, stating previous experience, to PARAMOUNT ALLOYS, LTD., 800/801, Oxford Avenue, Trading Estate, Slough.

RESPONSIBLE FOUNDRYMAN required, capable of taking complete control of Light Castings production, comprising Floor Foundry, Fully Mechanised Plant, Core Shop, Pattern Shop and Fettling Shop; must have sound technical and practical experience.—Write, stating age, experience and salary required, to R. & A. MAIN, LIMITED, Gothic Works, Angel Road, Edmonton, N.18.